REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
23/04/2012	Master of Military Studies Research Paper	September 2011 - April 2012

4. TITLE AND SUBTITLE
The Air War in Libya: Implications for the US, NATO, and the future role of airpower

5a. CONTRACT NUMBER
N/A

5b. GRANT NUMBER
N/A

5c. PROGRAM ELEMENT NUMBER
N/A

6. AUTHOR(S)
Major Jason R. Greenleaf

5d. PROJECT NUMBER
N/A

5e. TASK NUMBER
N/A

5f. WORK UNIT NUMBER
N/A

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
USMC Command and Staff College
Marine Corps University
2076 South Street
Quantico, VA 22134-5068

8. PERFORMING ORGANIZATION REPORT NUMBER
N/A

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSOR/MONITOR'S ACRONYM(S)
N/A

11. SPONSORING/MONITORING AGENCY REPORT NUMBER
N/A

12. DISTRIBUTION AVAILABILITY STATEMENT
Unlimited

13. SUPPLEMENTARY NOTES
N/A

14. ABSTRACT
Analysis of the air campaign against Libya in 2011. Specifically, it seeks to determe the lessons that the US and NATO should carry forward, and what overall airpower implications may be.

15. SUBJECT TERMS
Libya Air War; Operation Odyssey Dawn, OOD; Operation Unified Protector, OUP; airpower

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Marine Corps University / Command and Staff College
Unclass	Unclass	Unclass	UU	58	19b. TELEPONE NUMBER (*Include area code)* (703) 784-3330 (Admin Office)

INSTRUCTIONS FOR COMPLETING SF 298

1. REPORT DATE. Full publication date, including day, month, if available. Must cite at lest the year and be Year 2000 compliant, e.g., 30-06-1998; xx-08-1998; xx-xx-1998.

2. REPORT TYPE. State the type of report, such as final, technical, interim, memorandum, master's thesis, progress, quarterly, research, special, group study, etc.

3. DATES COVERED. Indicate the time during which the work was performed and the report was written, e.g., Jun 1997 - Jun 1998; 1-10 Jun 1996; May - Nov 1998; Nov 1998.

4. TITLE. Enter title and subtitle with volume number and part number, if applicable. On classified documents, enter the title classification in parentheses.

5a. CONTRACT NUMBER. Enter all contract numbers as they appear in the report, e.g. F33615-86-C-5169.

5b. GRANT NUMBER. Enter all grant numbers as they appear in the report, e.g. 1F665702D1257.

5c. PROGRAM ELEMENT NUMBER. Enter all program element numbers as they appear in the report, e.g. AFOSR-82-1234.

5d. PROJECT NUMBER. Enter al project numbers as they appear in the report, e.g. 1F665702D1257; ILIR.

5e. TASK NUMBER. Enter all task numbers as they appear in the report, e.g. 05; RF0330201; T4112.

5f. WORK UNIT NUMBER. Enter all work unit numbers as they appear in the report, e.g. 001; AFAPL30480105.

6. AUTHOR(S). Enter name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. The form of entry is the last name, first name, middle initial, and additional qualifiers separated by commas, e.g. Smith, Richard, Jr.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES). Self-explanatory.

8. PERFORMING ORGANIZATION REPORT NUMBER. Enter all unique alphanumeric report numbers assigned by the performing organization, e.g. BRL-1234; AFWL-TR-85-4017-Vol-21-PT-2.

9. SPONSORING/MONITORS AGENCY NAME(S) AND ADDRESS(ES). Enter the name and address of the organization(s) financially responsible for and monitoring the work.

10. SPONSOR/MONITOR'S ACRONYM(S). Enter, if available, e.g. BRL, ARDEC, NADC.

11. SPONSOR/MONITOR'S REPORT NUMBER(S). Enter report number as assigned by the sponsoring/ monitoring agency, if available, e.g. BRL-TR-829; -215.

12. DISTRIBUTION/AVAILABILITY STATEMENT. Use agency-mandated availability statements to indicate the public availability or distribution limitations of the report. If additional limitations/restrictions or special markings are indicated, follow agency authorization procedures, e.g. RD/FRD, PROPIN, ITAR, etc. Include copyright information.

13. SUPPLEMENTARY NOTES. Enter information not included elsewhere such as: prepared in cooperation with; translation of; report supersedes; old edition number, etc.

14. ABSTRACT. A brief (approximately 200 words) factual summary of the most significant information.

15. SUBJECT TERMS. Key words or phrases identifying major concepts in the report.

16. SECURITY CLASSIFICATION. Enter security classification in accordance with security classification regulations, e.g. U, C, S, etc. If this form contains classified information, stamp classification level on the top and bottom of this page.

17. LIMITATION OF ABSTRACT. This block must be completed to assign a distribution limitation to the abstract. Enter UU (Unclassified Unlimited) or SAR (Same as Report). An entry in this block is necessary if the abstract is to be limited.

United States Marine Corps
Command and Staff College
Marine Corps University
2076 South Street
Marine Corps Combat Development Command
Quantico, Virginia 22134-5068

MASTER OF MILITARY STUDIES

TITLE:
The Air War in Libya:
Implications for the US, NATO, and the future role of airpower

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

AUTHOR:

Major Jason R. Greenleaf, USAF

AY 11-12

Mentor and Oral Defense Committee Member: Mark Jacobson
Approved: Mark Jacobson
Date: 23 April 2012

Oral Defense Committee Member: Paul D. Gelpi
Approved:
Date: 23 April 2012

Executive Summary

Title: The Air War in Libya: Implications for the US, NATO, and the future role of airpower

Author: Major Jason R. Greenleaf, United States Air Force

Thesis: Most initial assessments of the air campaign against Libya laud its execution and label it a resounding success. These superficial assessments, however, fail to address the many problems that arose in both planning and execution that need to be examined and incorporated into future practices by both US and NATO forces or look at the potential implications the campaign has for the future role of airpower.

Discussion: From March 19 until March 31, 2011 the US-led Operation Odyssey Dawn took place enforcing United Nations Security Council Resolution 1973. The campaign then transitioned to NATO control under the banner Operation Unified Protector and continued until 31 October 2011. In just over seven months, the western led air campaign carried out its mission to protect civilians from Libyan dictator Colonel Muammar el-Qaddafi's forces. The coalition's air campaign also facilitated the overthrow of the Qaddafi government by the rebel Transitional National Council, a much weaker military force. The perceived success of this campaign came at a relatively low financial cost and resulted in no coalition casualties. Against the background of the last decade of fighting in Iraq and Afghanistan, many political and military leaders now believe that the air war in Libya is the preferred template for future interventions. Analysis of the campaign, however, demonstrates that the application of airpower alone may not be sufficient in deciding the outcome of intervention. Also, there were many issues from both the US-led and NATO-led portions of the campaign that must be addressed before a similar intervention is again attempted. While the US operation lasted less than two weeks, it highlighted inadequacies in the structure of US GCCs, inefficiencies in its resource deployment processes, incompatibility with coalition technologies, and interoperability deficiencies with partners who it routinely operates with. For NATO, Operation Unified Protector, was supposed to be its opportunity to show that it could lead a major operation with the US merely acting in a supporting function. Instead it demonstrated the lack of cohesion amongst the organization, the immense gap in its military capability and capacity, and the major limitations its structure, technology, and personnel had on its ability to run this relatively small air operation.

Conclusion: While it ultimately ended in success, if the US and NATO are to continue partnering for similar interventions in the future, which seems likely, they must seriously examine their deficiencies from this campaign and identify lessons learned. The next intervention may prove more difficult and the US and NATO must endeavor to make these improvements to ensure another positive outcome.

DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

Table of Contents

Preface

In March 2011, I left on a short-notice deployment to serve as a US E-3 liaison officer (LNO) for the US-led Operation Odyssey Dawn that was just getting underway. Over the next month and a half, the other US E-3 LNO, Lt Col Ed Goebel and I worked through many challenges to improve and refine the processes in place. We were also surprised, as were most other LNOs, as to how many difficulties arose from what was a relatively small-scale operation. The deficiencies that were noted from the US-led portion of the campaign, however, paled in comparison to those of the NATO-led operation, Unified Protector. For me it was a bit disheartening to witness what is considered to be the greatest military alliance in our history, struggle to execute an operation against a third-rate adversary such as Libya. When I found the opportunity to conduct further research on this topic for this paper, I was very interested to see what was being discussed by critics and pundits. To limit the scope of my research and length of this paper, I decided to predominantly remain focused on the military aspects of the campaign. There are many other dimensions that would make excellent research topics. So too, can many of the points discussed in this paper be further researched and developed in future studies. That is precisely my hope; that this paper can serve as a stepping off point for those interested in more in-depth analysis. As time passes, more information will likely be available and better assessments can be made.

Surprisingly, there were little formal studies published on the air war at the time of my research. There were some preliminary after action reports on Odyssey Dawn by the US military, but not very much in the way of substantial critiques. From NATO's Unified Protector, there was even less given its more recent conclusion. Thus, much of my research was limited to newspaper and journal articles. Some published studies from the Joint and Coalition Operational

Analysis division, formerly part of Joint Forces Command, also helped to substantiate my own observations. I also relied on assessments and personal accounts from other LNOs and from Colonel Mark Desens, who commanded the 26 Marine Expeditionary Unit during the operation. Finally, it is important to note that my research and writing were kept at the unclassified and releasable levels. There are likely more detailed assessments done by those involved that are obviously kept at a higher classification and limited distribution.

There are several people to thank for their contributions to my research and refinement of this paper. First, I would like to thank Dr. Mark Jacobsen for his help on focusing my topic, advice on writing, and for being an Airman at heart. Colonel Desens not only provided me with insight on MEU operations, but more importantly (though not captured in this paper), he put into perspective the strategic role of the military in providing our leaders with time to make their decisions. I would also like to thank my fellow LNOs who I learned a great deal from, and who ultimately endeavored to make the operation a success. Finally, I would be remiss to not express my gratitude to my wife and family who have been supportive and understanding of this and other assignments that have taken time away from them this year.

If there is one attitude more dangerous than to assume that a future war will be just like the last one, it is to imagine that it will be so utterly different we can afford to ignore all the lessons of the last one. - Sir John C. Slessor (Air Power and Armies, 1934)

On 31 October 2011, the last air mission of NATO's Operation Unified Protector (OUP) concluded.[1] In just over seven months, the Western-led air campaign, initiated in response to a United Nations Security Council Resolution (UNSCR) to protect Libyan civilians, allowed a rag tag group of rebels to bring about the defeat of a well-armed military and the downfall of a dictatorship that spanned more than forty years. As the dust settles, and as the interim government establishes itself, there is still some skepticism as to what the future will hold for this oil rich North African nation. Less in doubt, it seems, is the overwhelming consensus that the air war in Libya was a resounding success and a testament to what a coalition-led operation can do. Tomas Valasek, of the Center for European Reform in London, asserts that it was "As good a war as it comes."[2] Diplomats from the US and Europe agree with this evaluation and similarly describe the war's merits in superlatives. These superficial assessments, however, fail to address the many problems that arose in both planning and execution of the campaign. There are lessons from Libya that both the US and NATO forces need to incorporate into future conflicts, as well as implications that have bearing on the overall future role of airpower.

This monograph examines the operational military lessons from US-led Operation Odyssey Dawn (OOD), which occurred between the 19th and 31st of March, and the NATO executed OUP which followed. The preconditions set by Qaddafi's actions, the Transitional National Council (TNC), and the United Nations, directly influenced the military campaign that followed. A brief primer is included as Appendix A to familiarize the reader with this necessary background. There are many issues related to the conflict in Libya that deal with diplomatic-level policy questions: the righteousness of the liberal interventionist "responsibility to protect" mission, the ambiguity of objectives sought by the UN mandate, the scope of Presidential powers to commit forces without

Congressional consent, the precedent of an Arab leader being overthrown by other Arab nations, and the political intent of those countries involved. These facets are simply beyond the scope of this paper. Nor will any attempt be made to examine the shipping embargo or role ground forces may have had in the eventual victory by the TNC. Instead, the focus will primarily be on the military lessons learned in planning and executing the campaign and the implications that they have on the role of airpower in future conflicts, the specific lessons that the US should garner, and the dimensions that NATO separately needs to address if it is to remain a viable alternative and lead in future conflicts. In the end, though the objectives may have been accomplished, in many ways this campaign was a wakeup call for many involved.

Operation Odyssey Dawn

So for those who doubted our capacity to carry out this operation, I want to be clear: The United States of America has done what we said we would do.[3] – President Barak Obama

US Lessons Identified

From the outset, the United States did not want to take on the lead role in the crisis in Libya. Defense Secretary Robert Gates initially advised against the establishment of a no-fly zone (NFZ) and even after OOD began insisted that the conflict in Libya was not a vital interest to the US.[4] Almost immediately after operations began, the US was working diligently to transfer control of the campaign to NATO.[5] By March 31, NATO assumed full responsibility for the mission and OOD concluded. The limited time that OOD lasted, less than two weeks of actual combat operations, brought to light many deficiencies ranging from the strategic to the tactical. This should not detract from the impressive feat, that in less than a month those planning and executing this mission were able to stand up a Joint Task Force (JTF), focus a coalition of 15 participant nations despite rapidly changing strategic guidance, execute 2,000 missions gaining air supremacy, and hand over operations to another organization. As the Joint Forces Air Component Commander (JFACC),

General Margaret Woodward, USAF, would later recall, "history is clear…the operation was a great success."[6] It would be a disservice however, for those involved and for those who will be involved in future conflicts, to not capture what improvements need to take place before then.

US African Command (AFRICOM), which was tasked as the lead command for the operation, was beset with organizational deficiencies from the beginning. Secretary of Defense Gates unknowingly highlighted these inadequacies during the activation of the command in 2008, stating "AFRICOM's mission is not to wage war, but to prevent it."[7] Initially tasked with a non-combatant evacuation operation (NEO) and then reoriented toward conducting a kinetic operation, the newest Geographic Combatant Command (GCC), had difficulty figuring out how to execute a mission it never thought it would have to deal with.[8] The lean 300 personnel on staff had never practiced JTF operations with its component commands, nor could their Air Operations Center (AOC) serve as anything other than "a transportation command to support personnel and material transfers within the (theater)."[9] Instead, AFRICOM had to rely heavily on European Command's (EUCOM) personnel, facilities, and expertise to successfully execute the mission. As it is organized, equipped, and trained to only conduct theater engagement, AFRICOM struggled to put together a last-minute air campaign.[10] The lack of clear strategic direction and shortfall in resources complicated the command's ability to carry out the mission, but there were also external constraints which proved to be impediments to progress.

General Woodward was quick to recognize the shortfalls and limitations she faced with the organic capability at her disposal. As the mission evolved from a NEO, to a NFZ, to a mandate to "protect civilians," the scope and sense of urgency grew as well. Unable to keep up with this sense of urgency, however, were the Global Force Management (GFM) and Request for Forces (RFF) processes (see Appendix E).[11] So, even though the first and only RFF was submitted early and "almost immediately validated by AFRICOM and the Joint Staff, the approval for these resources

simply did not occur in time for operations."[12] This want of resources proved to be the most challenging constraint in the development of the strategy for the air campaign.[13] Particularly detrimental was the absence of critical enablers such as E-3 AWACS, E-8 JSTARS, and additional tankers which should arguably have been there first. Yet, they did not arrive until after combat operations began.[14] Additionally, because Intelligence, Surveillance, and Reconnaissance (ISR) assets possessing full-motion video were not available until after NATO took over the mission, it was difficult for pilots to distinguish the rebels from the pro-Qaddafi forces and to identify time-sensitive targets. Coupled with UNSCR 1973, which restricted the employment of NATO ground forces, the lack of ISR inhibited the ability to obtain accurate battle damage assessment and led to re-strikes on "targets that might have already been neutralized."[15] The uncertainty of what assets would be available and when they would arrive in theater also affected the ability of planners to use aircraft as efficiently as possible.

The overall basing decision, where to put all of the airplanes coming into theater, appeared haphazard and did not use the limited amount of air refueling assets available most effectively. The vast size of Libya, which is roughly the size of Alaska, and the lack of sufficient airfields close to the NFZ increased the transit time and made nearly all assets reliant on air-to-air refueling (see Appendix F). Basing decisions resulted in placing fighter assets closer to the fight at the expense of the heavy aircraft. As a result, the heavy aircraft required a tanker for each sortie to remain on station. A classic Catch-22 dilemma followed as the planners were forced to prioritize the tankers' gas between heavy command and control (C2)/ISR platforms or to the strike assets. The lack of ISR assets, limited pre-planned targets, and the requirement to minimize collateral damage meant that the majority of the attacks had to use Dynamic Targeting and Strike Coordination and Reconnaissance (SCAR) tactics to seek out and destroy pro-Qaddafi forces. By their very nature, DT and SCAR missions make strike assets dependent on air battle managers aboard the heavy C2

platforms. The planners often had enough gas to give to the aircraft who could pair the shooters with the target or to the shooter itself, but not both. Once a deliberate planning effort began, the liaison officers (LNOs) and planners made changes that maximized the effectiveness of the limited resources available. Clearly, this operation underscored the requirement of gaining access to bases and the importance of aerial refueling. This tyranny of distance was not a new phenomenon, however, and it should have been identified and mitigated earlier in planning.

Other lessons which should have been identified earlier include communication barriers between allied forces joined in the alliance. General Carter Ham, US Army, commander of AFRICOM, lauds the level of interoperability and coordination during the OOD as the ideal that future operations should seek to attain.[16] Throughout OOD and into OUP, however, there were several issues that impeded operations. Principal among these was the inability to communicate with NATO using classified systems which hindered information sharing. The US utilized US SIPRNET (Secure Internet Protocol Router Network) to plan and execute OOD. NATO does not have access to this system, however, and its members use NATO SECRET and CHROME systems for transmitting classified information.[17] While a solution known as the Battlefield Information Collection and Exploitation System (BICES) was developed in the late 1980s specifically to bridge this gap, it was not widely available for US forces and "didn't exist in AFRICOM."[18] The lack of BICES complicated the handover to NATO, especially during the early stages of OUP. Until BICES became available at locations where US assets were staged, there was no way to pass the Air Tasking Order (ATO) and other mission information via secure means. This often meant that LNOs were only able to pass basic sortie information to the crews, which would then have to check in with the airborne C2 agency to get the remainder of their ATO information. These compatibility issues were not just limited to personnel on the ground.

Another issue that took too long to work through was related to learning the detailed capabilities of the aircraft involved in the coalition (see Appendix G). Though a majority of the assets were from nations that are a part of NATO, there was no mechanism in place for disseminating basic information from all participants as to their aircraft capabilities. Planners were unfamiliar with the secure radio, data link, and other aircraft equipment each nation possessed. This affected the development of a communications plan, the ability to prioritize and deconflict frequencies, and the planning of search and rescue contingencies. Not only did the US suffer from a lack of compatible systems with its partners, but getting the systems to communicate proved to be a challenge as things that are "NATO Standard" were neither standard nor even accessible to the US assets. This was true with cryptology that needed to be loaded into the radios and other devices to make them secure, as well as methodologies of employment such as the role tactical C2 assets like the AWACS would serve.

Related to this lack of mechanical standardization was a lack of familiarity within the coalition assets and a lack of trust in mutual supportability. When the US AWACS LNOs first arrived in theater, the airborne C2 being provided was compartmentalized by each nation, with the French fighter packages only flying when the French E-3F or E-2 was on-station, the British fighters only when their E-3D was on-station, etc. It seemed a conceptual leap for planners to grasp the idea that each airborne C2 platform could and should provide the same level of service, irrespective of what nation's assets were under its control. Within a couple of days, NATO participants began to shed their secretiveness and airborne C2 was expanded to cover a full 24-hour ATO period. With the amount of training that should have occurred between the nations, particularly the preponderance of those on the European continent, it frustrated planners that there was not a higher level of inherent trust and interoperability ingrained prior to the commencement of

hostilities. This is even more off-putting since most nations contribute to or participate with the NATO E-3A squadron.

Implications for US Forces

The upside to the inadequacies of the US operation is that the majority of the issues can be resolved in the short-term. The US must address the deficiencies it has in the organizational structures of its GCCs. As General Ham can now attest, "Combatant commands don't get to choose their missions." If they are to have the same responsibilities and authorities as other commands, then the appropriate resources and mission sets must also be aligned. OOD exemplifies how certain GCCs are not task organized to handle missions yet are given ones that should have been tasked to others. Deciding who will lead the mission based on lines on a map rather than on capabilities caused undue consternation and confusion. Clearly, AFRICOM, without assigned operational forces save 17th Air Force and JTF-Horn of Africa, should not have retained the mission once it was decided it would be a kinetic operation. EUCOM, who ended up providing the bulk of the infrastructure, manning, equipment, and expertise, would have been the more logical choice. The decision needs to be made as to whether all GCCs will be resourced with capabilities to do both low and high-end operations or if not all GCCs will be full-spectrum commands.

The GFM/RFF process needs to be examined and refined. The push to lean supply chains and a "just-in-time" mentality is coming at the cost of flexibility in operations. Despite being in a resource-constrained environment, only sourcing four of the ninety requirements in a time-critical operation calls into question the Air Force's claim of being able to rapidly respond anywhere in the world.[19] This also highlights a real danger of relying too much on what the USAF calls reachback, referring to the reliance "on Stateside combat and support aircraft, or to CONUS-based support personnel tied electronically to forward units."[20] General Woodward echoed this sentiment and warned that OOD should serve as "a wake-up call."[21] Much credit belongs to the capabilities and

professionalism of the servicemen who were able to pull off the mission with the limited forces on hand, but they should not have needed to and, more importantly, it may not be enough or may come too late next time. Sun Tzu prescribed the requirement to provide commanders resources over 2,500 years ago, relating "To put a rein on an able general while at the same time asking him to suppress a cunning enemy is like tying up the Black Hound of Han and then ordering him to catch elusive hares. What is the difference?"[22] The US needs to ensure its infrastructure and systems enable the right assets to get to the right place, on time.

The US must come to the realization that it is part of NATO, and thus shares responsibility for any shortcomings of the organization. It is unimaginable that members of the world's largest military alliance would continue to develop and field incompatible systems. The US is still upgrading its C2/ISR platforms with secure air-to-ground internet chat ability. However, the US version (known as mIRC) is not at all compatible with the NATO version known as JChat.[23] Differing objectives, practices, and political constraints may drive nations to different procurement sources, but they should at least agree on standards that make systems interoperable. A service may elect to retain specific US-only systems as well, but it must still ensure it possesses those used by everyone else. Not having items that are NATO standard and prescribed by Standardized Agreements (STANAGs) undermines the already tenuous ability of the partnership to fight conflicts even fairly close to Europe. The US has mostly overcome its inability to communicate and cooperate amongst its various services, but now it must expand that standardization to coalition partners. In 2010, EUCOM recognized that it needed to rapidly employ BICES throughout the theater as "other NATO countries have been using the system for years;" however, in the Air Operations Center (AOC) there was only one available BICES terminal.[24] Even when equipment was compatible, the inability to get everyone access to standard, available cryptology meant that in many cases sensitive information needed to be passed over a clear radio frequency by way of code

words. Passing a 10-line targeting message over secure means between forces that speak the same language can still be a relatively time consuming process. Trying to pass this same message using code words with people not fluent in English or laden with heavy dissimilar accents drives the process to a grinding halt. This significantly slowed down the kill chain.

Both General Ham and General Woodward claim that OOD was a "testament to the day-to-day training, exercising, and interoperability we've built with various partners around the world," but the execution, especially during the early phases, indicate there is still a long way to go. There was not the inherent trust and familiarity between partners involved. Lacking actual combat experience, perhaps many countries were reluctant to introduce too many variables. Sweden, for example, had not engaged in combat or even deployed operationally in over fifty years prior to OUP.[25] To eliminate this hesitancy and improve mutual confidence, regional exercises and training need to be more realistic and inclusive. Participating in NATO or non-US led coalition exercises will identify required areas for improvement and limitations in a training environment. The US has repeatedly shown, however, that merely identifying lessons will not solve the problem, as many are quickly dismissed or forgotten. In 2000, the Air Force directed a comprehensive report by RAND that identified "potential interoperability problems that may arise in coalition operations of the United States and other willing NATO allies over the next decade" and offered solutions to mitigate those problems.[26] Yet, during the execution of OOD, it was clear that insufficient action was taken to address these identified challenges and those involved required real-time workarounds. The US must heed the advice prescribed earlier by Sir John Slessor and learn from these past experiences.

Operation Unified Protector

The operation has made visible that the Europeans lack a number of essential military capabilities. - NATO Secretary-General Anders Fogh Rasmussen

We are the only two countries, apart from the United States, in NATO who actually have the will, the guts if you like, to intervene where intervention is clearly needed to prevent a slaughter. – Former British Foreign Secretary Douglas Hurd referring to Britain and France

NATO Lessons Identified

This was the first major NATO air operation since Operation Allied Force (OAF) in the Balkans in 1999, and the first time the Europeans have taken the lead role with the US agreeing to play a supporting function.[27] An operation that began with much skepticism and clear shortcomings ended up prevailing in the end and has some claiming it to be a model for future interventions.[28] Still, others felt that OUP represented a "dark lesson for NATO," exposing fissures in the alliance and gaps in capabilities.[29] Regardless of the outcome of these debates, there are clear issues – spanning from strategic to tactical- with which NATO must contend.

Strategically, OUP revealed a lack of organizational cohesion as less than half of the member nations contributed to the operation.[30] Discounting the US and Canadian contribution, only six European countries delivered any offensive capability. When compared to Allied Force, in which 14 of the 19 alliance members contributed forces, it is little wonder why some call into question the ability of the organization to act in unison and how it bodes for the future security identity. Defense Secretary Gates blasted NATO this past summer, asserting that it had deteriorated into a two-tiered membership structure "between those willing and able to pay the price and bear the burdens of commitments, and those who enjoy the benefits of NATO membership but don't want to share the risks and the costs."[31] Some nations that abstained from participating, notably Germany and Turkey, were able but unwilling to take part in the operation. Even more disconcerting, however, is that most member nations simply could not contribute militarily.

In addition to perceived paucity in its resolve, OUP exposed significant limitations in the alliance's military ability. Many European leaders want to emphasize the fact that NATO played a lead role in the mission with the US only supporting by providing "unique capabilities."[32] The role played by the US, though, was critical in filling gaps in ISR, air refueling, and unmanned drones. So, while the US only flew 25 percent of the sorties in OUP, it still provided half of the aircraft deployed, eighty percent of the air refueling and ISR missions, and augmented airborne C2 providing 25 percent of the coverage and control.[33] The remaining ISR capability was mostly provided by the UK and France, who also accounted for half of the strike forces, reiterating the lack of burden sharing amongst participants.[34] NATO also depended on the US for nearly all its suppression of enemy air defense missions and for combat search and rescue.[35] Quite simply, Europe could not have conducted this operation without significant support by the US. Additionally, Europe is not likely to make any progress in attaining these capabilities anytime soon. Already, of the European members in NATO, only three (France, Britain, and Greece) are spending the required two percent of GDP on their military spending and overall in the last two years defense spending on the continent has decreased by $45 billion.[36] Furthermore, key ISR assets such as UK's Nimrod and Sentinel, which comprise two of the three parts of the ISTAR (intelligence, surveillance, target acquisition and reconnaissance) cross-cueing synergy that Libyan operations validated, will retire soon and not be replaced for several years.[37]

Even with the assets the nations were able to get to the fight, their ability to sustain them over the long term was limited. Initially, the Libyan operation was expected to be short-term, with NATO only forecasting operations out until July. NATO deserves some credit in being able to pass two three-month extensions, but though their hearts may have been prepared for the long haul, their forces and supplies were not. By early June, reports surfaced that several nations were running out of weapons, requiring the US to replenish their depleted stockpiles. Soon after this came out,

Norway, who had contributed 17 percent of the strike missions with just six aircraft, announced that it would be withdrawing its forces because of the excessive burden on its small force.[38] The 26,500 sorties launched over the campaign may appear significant until one considers that in the mere 78 days of OAF more than 38,000 sorties were flown with non-US members flying 15,000 of those.[39] An even greater concern amongst the coalition was that the air operations were designed "for an effort of 300 sorties a day but was struggling to manage 150."[40] That the alliance's capability was strained on what is considered "a very small operation" is troubling.[41]

In addition to NATO's lack of air assets, its ability to lead the operation on the ground was feeble. Rear Admiral Russell Harding of the British Royal Navy contended that forces were able to make a "seamless transition" from the US-led OOD to the NATO-led OUP.[42] Others involved in the operation revealed that this was not the case, and that "momentum was lost during the transition to NATO control."[43] Indeed, contending with the deficient facilities of the Combined Air Operations Center (CAOC) alone would have prevented the transition to be anything but seamless. The CAOC at Poggio Renatico, Italy lacked infrastructure to support the handful of permanently assigned personnel there at CAOC 5, let alone the hundreds of LNOs and other support personnel descending onto the base. Within a few days, its temporary facilities were busting from the seams. Right away, it was clear that NATO was not organized or resourced properly to take control of the operation.

Command and control of the campaign had transitioned from a USAF AOC with a robust communications and computer infrastructure to one that lacked equipment for an operation of this scope. The coalition's limited securable radios compounded the new CAOC itself; there were only two rudimentary SATCOM radios with handsets available to conduct operations. Since US assets did not possess JChat capability, nearly all airborne communication, time-critical and administrative, had to go through only two available frequencies. Additional equipment

interoperability issues were present, as the secure telephones on the AOC floor could not be used to communicate with US secure phones at their bases, and neither side could acquire access to the other's capability. The ad-hoc facility that was constructed for US LNOs gave them access to SIPR, SATCOM, and secure phones to talk to their US counterparts but still did not allow them to communicate to the CAOC a few hundred yards away. This meant that messengers had to be dispatched from one location to the other in order to pass information when the personnel on the CAOC floor could not get in contact with an airborne asset via the means available, or vice versa.

Differences in execution from OOD to OUP did not stem merely from the inadequate facilities; they were also a reflection on the respective training programs and C2 structure. During OOD, the US was able to overcome the lack of personnel experience with the standardized training processes each person assigned to an AOC receives.[44] For the most part, each US AOC has the same functions, processes, and even a guidance document covering tactics, techniques, and procedures.[45] While the US invests considerable time and effort training its AOC personnel, NATO, as an organization, does not. Due to its organizational structure and internal processes, NATO does not have standing forces under its command, and force generation does not begin until the North Atlantic Council approves the concept of operations.[46] The next step requires time for coordination across the entire NATO alliance to acquire assets and personnel, lending additional support for the reflective observation by LCDR Dave Ehredt, USN, that "NATO is not known for its speed or agility when responding to an international crisis."[47] Because of the compressed transition schedule and NATO's unresponsive system, the CAOC in Italy required major augmentation of US personnel, specifically in targeting specialists, to do the job.[48] Moreover, of the limited personnel that NATO had working the CAOC functions on the floor, most had never performed the function before and lacked the training and qualifications to do so.

The NATO C2 architecture for air operations was also convoluted and added to the dysfunction. The main CAOC was at Poggio Renatico, but CFACC and staff were at Izmir, Turkey (in theory, in practice CFACC wisely chose to move to Poggio to speed up the decision cycle within air operations) and targeting was being done by HQ in Naples. Despite conferences and resolutions by member countries to evolve the NATO command structure to be prepared for "out-of-area operations" and non-Article 5 missions, OUP demonstrated that more research and initiatives are required.[49] NATO is not set up to conduct distributed operations in this manner and with everything being decentralized, this organizational structure further handicapped an already deficient and inexperienced staff's execution.

The problems with the equipment and lack of trained personnel at the CAOC worked to magnify the issues that national caveats play in a coalition structure. Within any coalition there are different rules of engagement (ROE), approval processes, and levels of collateral damage that any nation is willing to accept. During OUP, there were no standing coalition rules agreed upon so the ultimate decision on whether or not to strike a target was typically not made in the cockpit, but rather back in the CAOC by the nation's "Red Card Holder." Red Card Holders were senior ranking officials from nations conducting strike missions that were consulted during the targeting process. This additional layer of decision making further compounded the time-delays resulting from the incompatible cryptology, language barriers, and the need to rely on DT and SCAR tactics. Often a strike asset had to return to base due to low fuel after waiting for over thirty minutes to seek and obtain approval to engage a hostile target, sometimes leaving the target intact. These delays likely contributed to Rebel complaints early on in OUP that NATO's air campaign was not doing enough to attrite regime forces.[50]

Implications for NATO

Unlike the inadequacies that impeded the US-led operation that could be overcome, many of the issues that plagued NATO will not have an easy solution. The organization's inability to gain consensus on an operation that had the necessary legal basis through UNSCR 1973 and the political legitimacy with the support of the Arab League raises questions about the ability for the EU to ever emerge with "a common European perspective" on defense.[51] Some pundits think that the operation can be seen as a symbol of "America's success in convincing its Allies that Europeans have to take a greater share of the burden and assume greater responsibility for security in Europe and its periphery."[52] Indeed, while it was promising to witness the UK and France (which only recently recommitted itself militarily to NATO) take the diplomatic lead in the operation, the transition to NATO only served to highlight the lack of capabilities the US seeks to leverage in the future.

The capability gap that exists in Europe and its overreliance on US needs to be seriously addressed by both NATO and the US. Some analysts have tried to play down the importance of the US supporting capabilities, but even "the most advanced fighter aircraft are of little use if the allies do not have the means to identify, process, and strike targets as part of an integrated air campaign."[53] These are not optional extras in an air campaign; they are essential capabilities that right now only the US seems able to provide. Even with the capabilities NATO members do possess, they need to make an investment in weapons and support to make sure they can operate at required levels. A lesson observed following OAF was that shortages of precision-guided munitions posed a threat to the overall success of the mission.[54] In a much smaller Libyan mission, the problem arose again, and early on. When NATO took over the operation, the Libyan integrated air defense and any airborne threats had already been taken care of by the US, so NATO aircraft faced no opposition. Still, even Qaddafi's antiquated defense system and minimal air force would

have been a daunting challenge for the Europeans alone. NATO relied on the US not only for air assets but also for targeting and personnel, without which the operation would have proved far more difficult. The current US Secretary of Defense, Leon Panetta, echoed his predecessor's warning to European leaders that the US will no longer be able to absorb and cover alliance shortcomings.[55]

Today the US and NATO are playing a dangerous game of military brinksmanship, but instead of seeing who will back down first, they are trying to force the other side to step up. Each is molding its forces with the faulty assumption that the other will be able to make up the difference. In the end, they are both hedging their respective security underpinnings on being able to leverage the other's capabilities – that may or may not be there in the future. With the US National Security Strategy counting on alliance support, the UK and others' diminishing force size, NATO's apparent two-tiered membership, and a global economic downturn, the prospective of burden sharing for collective security does not appear promising. As *New York Times* columnist Steven Erlanger noted, the jury is still out on whether the Europeans "will develop the security and defense identity they have advertised for so long…or given the expense and difficulties of defeating even Libya, they will simply stop trying."[56]

In the interim, NATO must refine its current structure and processes to find low-cost, high-payoff solutions. This may come in the form of improving training and rewriting publications so they align with actual practices of the member states. With several NATO members in straits and others facing fiscal shortfalls, they cannot afford to invest in disparate technologies or doctrine from allies it requires for support. It should also consider merging and reorienting its C2 architecture further away from its legacy Cold War design.[57] Rather than having several smaller CAOCs with limited ability, it would be better to have one or two that were actually manned, trained, and equipped to be fully functioning. While NATO has taken steps to reduce some of its redundancies and architecture, the current design still presents a capability and ambitions mismatch. Prior to

undertaking these changes though, NATO must reassess its strategic ambitions and determine whether or not it is still committed to pursuing capability to conduct "out-of-area" operations or if it will resign itself solely to pure Article 5 (collective defense) missions.

The design and equipping of the C2 architecture should take into consideration equipment capabilities of member nations and seek to leverage existing practices established in Afghanistan. NATO also needs to set up a training program, similar to that of the US, which standardizes training personnel assigned to a CAOC receives. Finally, while it is improbable that all nations participating in future operations will agree entirely on rules of engagement or on how much collateral damage risk to accept, a standard needs to be developed and codified ahead of time to prevent the delays experienced in this operation. This could take the form of matrices of choices that a country's representative signs up to from the outset, i.e. NATO Standard ROE 1a, CDE B, which makes it readily apparent to planners and operators who can be tasked to which targets. These changes will help to reduce the friction involved in early stages of the operation and make the force more effective from the start. In the future, the alliance may not be so lucky to have an adversary that gives it time to build up and practice, or a US force that sets the stage before handing over control, so it needs to be ready from the outset.

Airpower Lessons and Implications

In the development of air power one has to look ahead and not backwards and figure out what is going to happen, not too much what has happened. - Billy Mitchell (Winged Defense, 1925)

For good or for ill, air mastery is today the supreme expression of military power and fleets and armies, however vital and important, must accept a subordinate rank.
-- Winston Churchill, 1949

One hundred years before OOD, Italian Captain Carlo Piazza flew his Bleriot XI on a reconnaissance mission over Libya, marking the first time an airplane was used in war.[58] A month later, fellow aviator Sub-Lieutenant Giulio Gavotti would be the first pilot to drop bombs just south

of Tripoli.[59] For aviation and airpower advocates, 2011 was a chance to commemorate many significant anniversaries. It was the 90th anniversary of Billy Mitchell's sinking of the Ostfreisland, the 70th anniversary of Pearl Harbor, the 20th for Desert Storm, and the 10th for Operation Enduring Freedom.[60] From the start of the Libya operation, scholars and pundits everywhere began postulating and prophesying what this would mean for airpower. With it clear from the beginning that coalition ground forces would not be involved, OOD seemed like a chance to finally determine whether or not airpower alone could be enough to attain victory. In the end, however, there were no clear-cut results and many different conclusions may be reached.

The airpower takeaways from Libya are important in many ways. First, the environment and circumstances associated with the war are likely to be representative of conflicts in the near future. Libya offered a new approach on attaining positive outcomes for intervention advocates when a responsibility to protect mission is warranted.[61] The piecemeal makeup of the alliance was another commonality likely in future conflicts. Nations will no longer go in unilaterally, and the coalition that develops will have a wide variety of partners with disparate capabilities and national caveats. Secondly, following the recent end of the drawn out land war in Iraq and upcoming end in Afghanistan, it is unlikely that alliances will agree to large troop commitments in the near future. Airpower offers a responsive, relatively inexpensive, and low risk option for political leaders. For all of the talk of the expense of the cruise missiles and smart bombs, they are still but a fraction of the cost of sending in an army. Additionally, as Libya showed, allied airpower could execute a seven-month campaign without a single coalition casualty and very little collateral damage to civilians (see Appendix H). Finally, as nations everywhere face inevitable decreases in military spending, tough choices need to be made as to which programs to keep and which services to take from. Some observers are guessing that Libya's results will bode well for air forces around the world, while others suggest that it proved that these forces may not be worth the investment. After

all, the world's preeminent and costliest fighter, the F-22 Raptor, ended up missing the fight altogether.

The first conclusion that some critics have reached is that airpower failed to fulfill its promise of being able to achieve decisive results without the support of a strong ground component. Most theorists figured early on that Qaddafi's regime would crumble fairly quickly once it faced coalition attack, yet it endured for seven months. The regime certainly appeared to be heading for quick defeat when the US had knocked out the Libyan air defense, grounded the Libyan Air Force, and was flying unopposed within the first few days. But then "the world's premier military alliance and the three most formidable militaries in the world" barely prevailed "over a third-rate despot."[62] If the Libyans, whose defense spending was one eight hundredth that of the opposition, nearly forced a stalemate with the Western alliance, then this campaign may not be the exemplification of airpower's promises.[63]

To address accusations of airpower not having been decisive, proponents claim that it did not attain overwhelming results against Libya because of military and political limitations. Airpower was relegated to tactical choices, rather than strategic targets.[64] Many lament that this waste of potential, turning "an air force into an exceedingly expensive artillery branch."[65] The US and NATO air chiefs did not have clearly defined objectives for them to achieve either. Retired Air Force General Chuck Horner, who led the coalition air campaign in Desert Storm, indicated early on "to succeed, military leaders need clearly defined goals that can be achieved by the use of force."[66] The UNSCR overly constrained what the air forces were able to accomplish. With a nebulous mission of "protecting civilians," it was unclear how far the alliance was supposed to go offensively against pro-Qaddafi forces. Initially, it was apparent that the alliance needed to stop Qaddafi's advance toward the rebel stronghold of Benghazi, but once that was accomplished the mission became more and more ambiguous.[67] NATO then took on a more graduated and coercive

approach that did not initially target Qaddafi's military capacity or try to overthrow him.[68] While this approach drew criticism from those looking for a "shock and awe" type display of airpower, it likely assured eventual success as the rebels would not have been able to exploit the success.[69] By extending the war and leveling the playing field for the rebels, airpower gave the TNC the time it needed to organize and coalesce rather than create a power void.

Perhaps then, while not glamorous, airpower in Libya did exactly what it was supposed to do. The US Air Force has long contended that the strength of airpower is in its ability to be flexible and scalable. It is unique from other forms of military power in how it can simultaneously hold a wide range of targets at risk and "provide a spectrum of employment options with effects that range from tactical to strategic."[70]

Regardless of eventual assessments of air operations in Libya, one question that emerged and remains to be answered is in defining what constitutes "airpower". The US Air Force recently defined airpower for the first time in their capstone doctrine manual as "the ability to project military power or influence through the control and exploitation of air, space, and cyberspace to achieve strategic, operational, or tactical objectives."[71] Conspicuously absent from this definition is any mention of delivering kinetic effects, indicating that airpower is more than firing missiles and dropping bombs. NATO seemed to have plenty of strike assets but was deficient in ISR, tankers and remotely piloted aircraft. There was clearly a contention that by not having these assets, the European nations of NATO are missing ingredients that constitute airpower. Against Libya it was US and British submarines that launched a barrage of Tomahawk cruise missiles to destroy key air defense nodes.[72] A significant portion of the French strike sorties were launched from the *Charles De Gaulle*, just as US Harriers proved vital in interdicting and repelling forces threatening to overtake Benghazi on the opening hours of OOD.[73] This seems to show that in Libya, "the actual use of airpower…highlights the fact that 'airpower' is not necessarily the same thing as a country's

air force."[74] In the end, even though the campaign against Libya can said to have been decided by "airpower", it is less clear to define what that means. Undoubtedly, services and programs facing budget cuts will seek to leverage this ambiguity in vying for additional resources.

As defense purse strings grow tighter, the airpower community needs to closely assess how it will invest its precious resources over the coming years to face the threats of the future. The investment may call for an increase in overseas basing rights, or at a minimum, ensure they are not closed or unavailable in the future. In order to overcome the non-availability of these bases, the US and other countries continue to develop deep strike capabilities such as the new long-range strike bomber concept. These programs are expensive, though, and still require forward basing and a need to build and maintain an air refueling capacity. To close this gap, some countries have relied on STOVL or VSTOL aircraft launched off ships. As seen in Libya, these were key difference makers, particularly in the initial stages of the campaign where speed was of utmost importance and distance was restrictive to other available means. Many nations do not possess this capability however, and some that do, such as the UK, have taken steps that leave them without such a capability for the near future. If militaries are all shrinking, the forces that have shared intervention outlooks need to find ways to develop compatible and interoperable systems, doctrine, and training. This is the only way they will be able to do more with less.

Finally, most future adversaries recognize that they cannot stand toe-to-toe with the US or its allies in a traditional battle of attrition. As a result of Desert Storm, adversaries realized that the amount of preparation time given to coalition forces is inversely proportional to their chances of success. Thus, the only chance they have to seek a victory will be through quick, decisive measures. The need for airpower to react with speed and overwhelming force seemed to be the counter to this course of action. However, Libya now shows both sides of the fight, that the results may be inconclusive if the enemy can force his adversary to seek limited political objectives. If the

enemy can prolong the fight long enough and force a stalemate, it may be able to secure victory when it becomes politically unpalatable for an alliance to continue. Airpower in this situation must still retain its speed and flexibility, but it also needs to be persistent and enduring. It thus appears that there is no clear-cut capability that airpower must gain or retain to combat adversaries of the future. What remains without question though, is that control of the air must be achieved and maintained to be successful.

Conclusion

None would dare to aver that there will be no more war, for if that were so then the problem would have been forever solved; and if wars there are to be they will be lost or won in the air.
-- Brig Gen P.R.C. Groves, RAF, 1922

Over a campaign that lasted as long OOD/OUP did, there are many reports that will likely follow as more information becomes available. The details and judgments presented represent but a portion of the aspects that require extensive analysis. The examination presented should raise questions and provide issues for discussion. The critique levied on the campaign is in no way meant to demean or diminish the work that was done. Rather than being critical, it is meant to ensure we learn lessons, rather than simply identify them and subsequently ignore them.

In retrospect, perhaps Libyan operations are best remembered as Colonel Mark Desens, commander of the 26 Marine Expeditionary Unit, reflected that in the end, "despite the warts…that you and I both know where those warts were…it was more or less successful…and certainly alleviated a lot of human suffering."[75] There is no doubt that without the intervention, Qaddafi would still be in charge and his forces would have brutally quelled the rebel uprisings in Benghazi and elsewhere throughout the country. History will be the ultimate judge of the righteousness and success of the intervention. However, it is difficult to downplay the asymmetric advantage given to the rebels by coalition airpower. The coalition and its application of airpower may not provide the

template for future conflicts, but it will likely inform future tactics, training, and transformation decisions for those involved. The campaign against Libya did not conclusively resolve the notion of airpower's primacy in war, but it is already perceptible that its legacy as a low-risk solution for political leaders is being extolled.[76] The next conflict will be different from this one, just as this was different from the last one. While it ultimately ended in success, if the US and NATO are to continue partnering for similar interventions in the future, which seems likely, they must seriously examine their deficiencies from this campaign and identify lessons learned. The US needs to examine the structure of its GCCs, refine its deployment processes, make compatible or standardize its technologies, and allow partner nations to take the lead in combined exercises. NATO has more difficult obstacles to overcome, but must at least start with a strategic decision by its members to determine their commitment to continuing to reorient toward conducting out of area operations. This determination will focus the development of capabilities during a period of economic downturn and allow allies to make informed decisions on how to maximize interoperability with the organization. The next intervention may prove more difficult and the US and NATO must endeavor to make these improvements to ensure another positive outcome.

APPENDIX A
BACKGROUND – ROAD TO REVOLUTION AND INTERVENTION

Those who make peaceful revolution impossible, make violent revolution inevitable. - John F. Kennedy, 1962

The uprising in Libya was part of the series of revolts against established autocracies that began in Tunisia in December 2010 and spread throughout different countries to include Egypt, Algeria, Morocco, Yemen, Syria, Bahrain, and Sudan.[77] This civil unrest, collectively known as the Arab Spring (see Appendix B), began as peaceful protests and demonstrations in Libya beginning in January 2011. By February, the protests increasingly grew in organization and size and, inspired by events in Egypt and Tunisia, anti-government organizers called for a "Day of Rage" to take place on February 17.[78] Reacting to this opposition, Colonel Muammar el-Qaddafi, who had ruled Libya since 1969, vowed to crush the "rats and mercenaries" and "cleanse Libya house by house" unless the protestors surrendered.[79] After an escalation of violence perpetrated by Qaddafi's forces against the protestors, the United Nations Security Council unanimously adopted UNSCR 1970 on February 26, imposing sanctions on the Libyan regime and calling for an end of what it referred to as "the gross and systematic violation of human rights" taking place.[80] In a press conference that would foreshadow future events, Ban Ki-moon, United Nations Secretary-General, warned "today's measures are tough…in the coming days even bolder action may be necessary."[81]

The day after UNSCR 1970 passed, the US, France, England, and others began discussions of possible military invention and enforcement of a no-fly zone. By March 3, AFRICOM established Joint Task Force-Odyssey Dawn (JTF-OD) under Admiral Samuel Locklear, USN, with the task to be prepared to conduct non-combatant evacuation operations for American citizens.[82] As it was becoming increasingly evident that bolder action would indeed be necessary to bring about an end to the violence, international support began to coalesce for further collective action. British Prime Minister David Cameron and French President Nicolas Sarkozy publicly called for Qaddafi to step down and on March 10, France was the first country to recognize the newly formed Libyan TNC "as the legitimate representatives of the Libyan people."[83] Two days later, in a much

welcomed statement, the Council of the League of Arab States endorsed a request to the UN Security Council to immediately impose a NFZ and take preventative measures to provide protection for Libyan citizens.[84]

Meanwhile, the sanctions against Qaddafi had no perceived effect on curbing the violent repression against his people and, if anything, it seemed to incense him even more. While the rebels were having some success at defending the oil-rich city of Brega against Qaddafi's forces and maintaining their stronghold of Benghazi in the east, Qaddafi had a disproportionate fighting advantage in the form of airpower.[85] The rebels, unable to exploit the bases and planes they captured in the eastern part of the country, were defenseless against Qaddafi's aircraft. In addition to the firepower the planes and helicopters offered, "[they] gave the Qaddafi forces an additional advantage in moving ammunition and supplies, a crucial factor given the length of the Libyan coast between…Benghazi and Tripoli."[86] Within a couple of weeks of fighting it appeared that Qaddafi's forces were gaining traction as they had pushed eastward surrounding the city of Ajdabiya and claimed to have retaken Misurata (see Appendix C). In a move to destroy the rebel's center of gravity, Qaddafi announced that his army would move against the bastion of Benghazi and vowed that there "would be no mercy or compassion" for those who fought him.[87]

As Qaddafi forces continued bombarding Ajdabiya with artillery fire and massing troops for the final assault against Benghazi, concerned world leaders debated over a possible military intervention. Franco Frattini, Italy's Foreign Minister, rejected the notion of intervening.[88] Many others powers, however, strongly pushed for the proposed UN-approved no-fly zone as a minimum. Qaddafi's son Saif al-Islam scoffed at the threat of intervention, indicating that within 48 hours the pro-government forces would retake Benghazi and the military operations would be finished. "Whatever decision is taken," he said, "it will be too late."[89] Just as diplomatic efforts to stop him seemed to be waning and following days of acrimonious debate by the Security Council, UNSCR 1973 was finally adopted on March 17, 2011. The resolution detailed enforcement of the previous arms embargo established by UNSCR 1970, established a NFZ, and authorized states "to take all necessary measures…to protect civilians and civilian populated areas under threat of attack in the

Libyan Arab Jamahiriya, including Benghazi."[90] Key points to this resolution was the abstention by China, Russia, Brazil, India, and Germany, as well as the provision that there would be no foreign occupation force, of any form, on any part of the Libyan territory.[91]

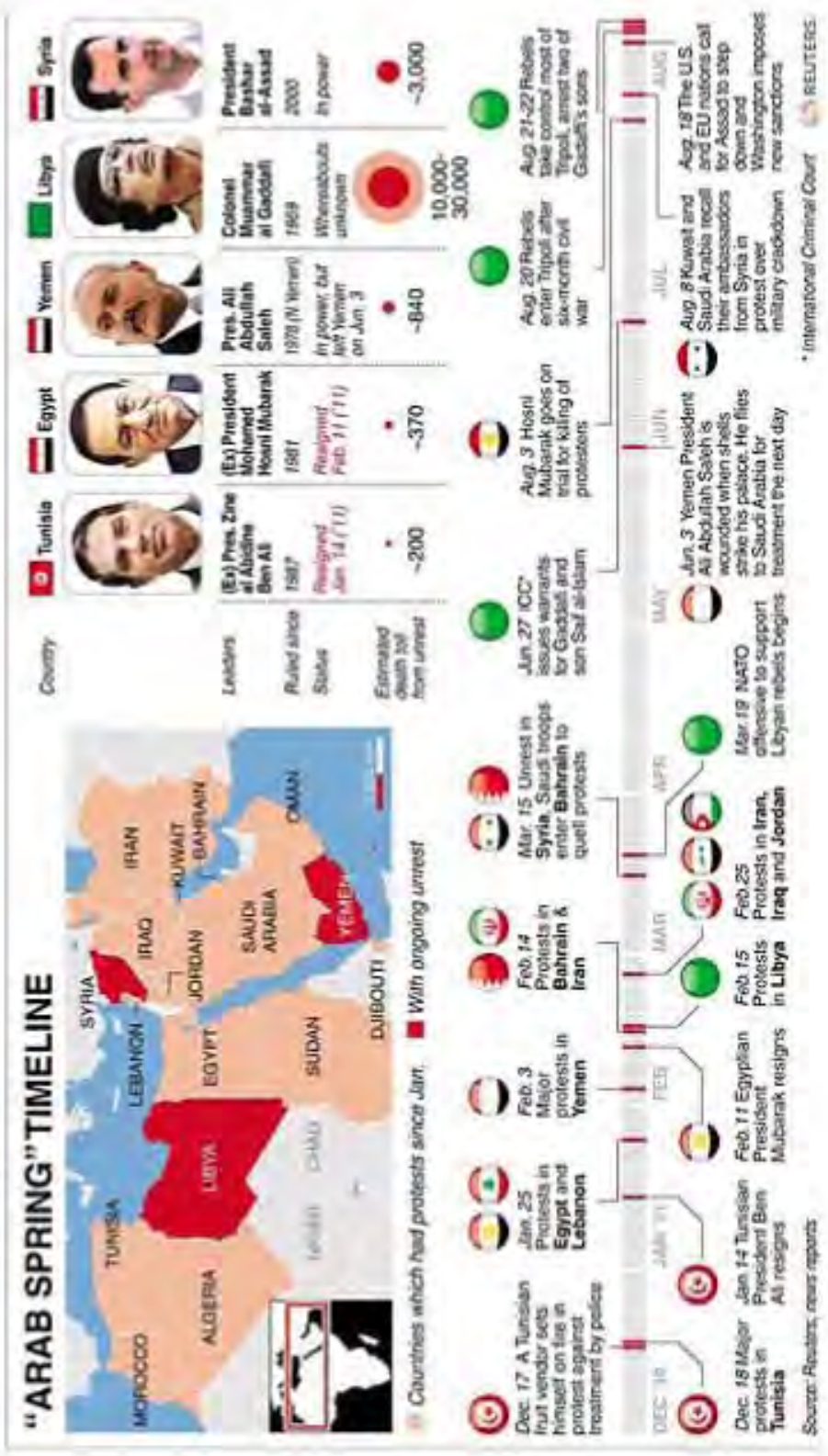
Following the decision of the Security Council, President Obama made a televised appearance on March 18, announcing that the US and its allies would take action to implement the provisions of the resolution. France, an outspoken proponent of taking military action, convened a meeting in Paris with allied and Arab leaders on March 19 to get an endorsement for the immediate deployment of aircraft to stop Qaddafi's assault on Benghazi.[92] In bold fashion, President Sarkozy initiated Operation Harmattan, with French fighter jets attacking Libyan armored vehicles and tanks on the outskirts of the city even before the meeting was concluded.[93] Later that evening, British operations launched under the codename Operation Ellamy, and US-led OOD commenced with volley upon volley of Tomahawk missiles being fired against fixed targets throughout Libya.[94] Within a week, the OOD coalition had suppressed the Libyan air defense system, was enforcing the NFZ unabated, and was interdicting Libyan forces attacking rebel positions. The US, anxious to hand-off the operation to someone else and play only a supporting role, coaxed NATO over the next week to transition from reluctant agreement to enforce a maritime embargo to assuming total mission leadership.[95] On March 31, OOD concluded and JTF-OD was disestablished with NATO conducting the campaign under the banner OUP.[96]

The NATO-led air campaign, which included four Arab states and Sweden, was determined to continue where OOD left off. The alliance was conducting an average of 115 sorties a day but appeared to make limited progress to turn the tide in favor of the rebels.[97] Operations began to stagnate as it appeared that neither side would be able to mount a decisive battle against the other. By June, NATO's apparent inability to make progress and reported lack of resources by nations involved began to draw harsh criticism (see Appendix D). Among those delivering the assault was outgoing US Secretary of Defense Robert Gates, who blasted NATO in one of his final statements, "The mightiest military alliance in history is only 11 weeks into an operation against a poorly armed regime in a sparsely populated country — yet many allies are beginning to run short of munitions,

requiring the U.S., once more, to make up the difference."[98] To break the stalemate, NATO officials began to take a more liberal interpretation of the UNSCR 1973 and began deliberate attacks against Qaddafi's military and security capability.[99] Additionally, several countries such as the UK, France, Egypt, Qatar and UAE apparently deployed Special Forces troops into Libya to assist the rebels. This led to improved coordination between the ground and air forces and an eventual breakthrough by the rebel forces. After months of inconclusive fighting, finally by mid-August, the rebel forces closed in on Tripoli and tightened their grip on Qaddafi's forces.

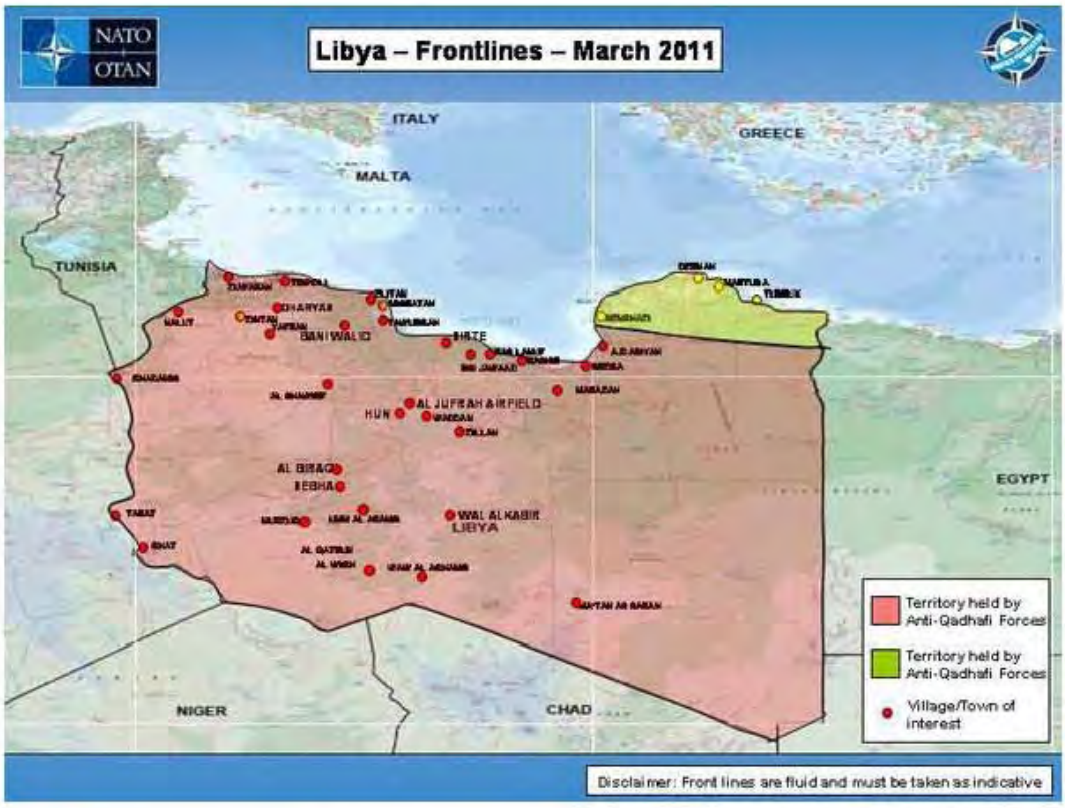
On August 20, in a coordinated effort with coalition airstrikes, rebel forces pushed into Tripoli as part of Operation Mermain Dawn, a three-pronged assault on the capital.[100] By 23 August they had entered Qaddafi's Bab al-Azizia compound, signifying a symbolic end to his regime. Fighting continued elsewhere in the country as the interim TNC government began to establish control. Claiming that the retreat from his compound was a tactical maneuver, Qaddafi pledged "martyrdom or victory" in the fight against NATO and the rebels.[101] Rebel forces obliged the dictator with the former in an apparent execution on October 20. With the loyalist forces' *raison d'être* eliminated, and after over seven months of fighting, NATO was finally able to announce an end to their operations. On October 31, 2011 after over 26,500 sorties, including 9,700 strike sorties, OUP ended.

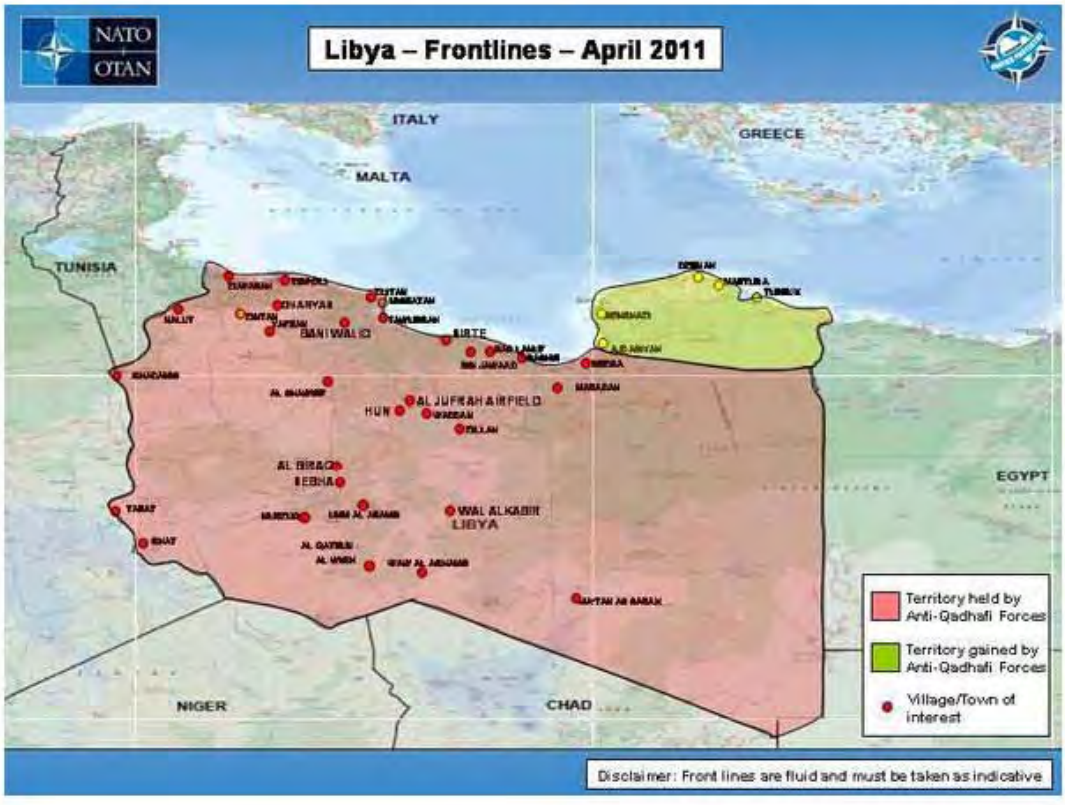
APPENDIX B
ARAB SPRING TIMELINE

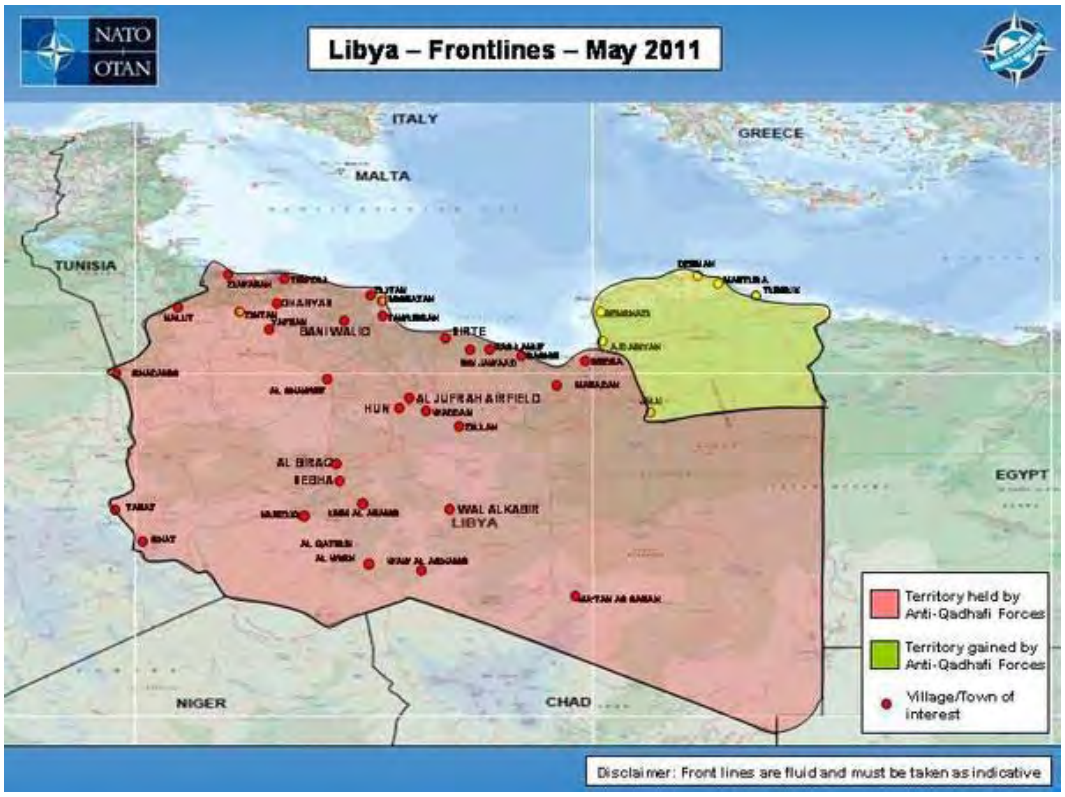


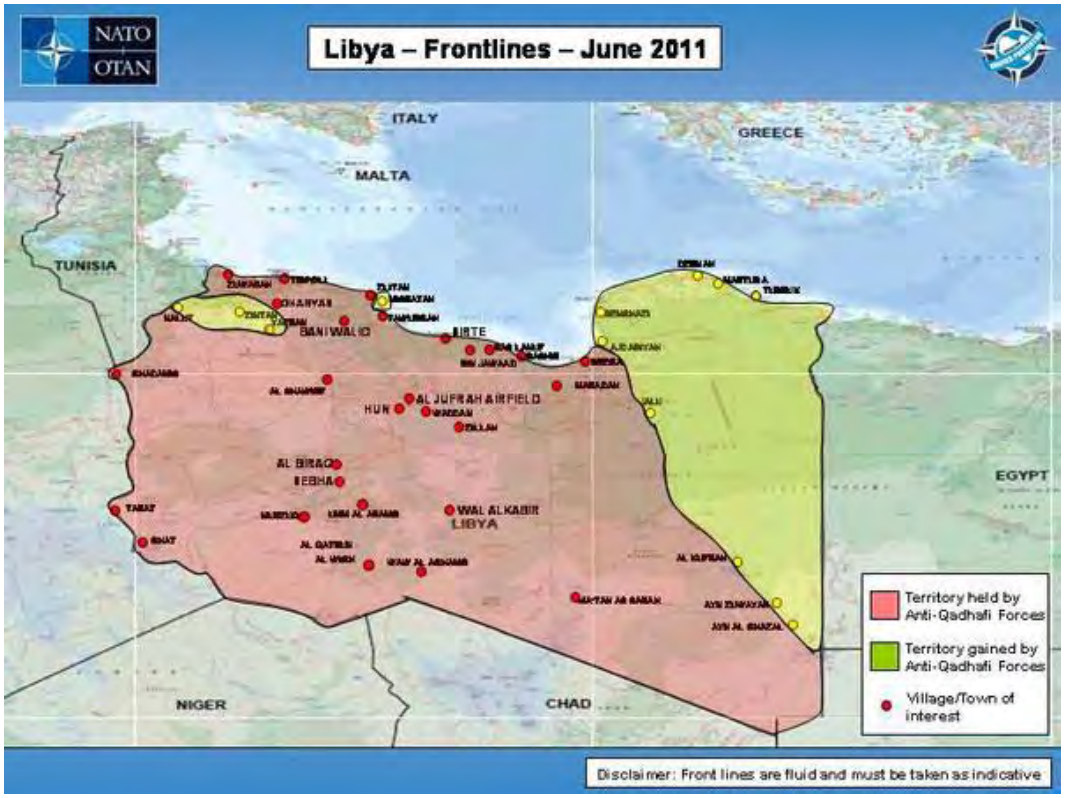
APPENDIX C
DEPICTION OF LIBYA'S MAJOR CITIES/CRISIS POINTS

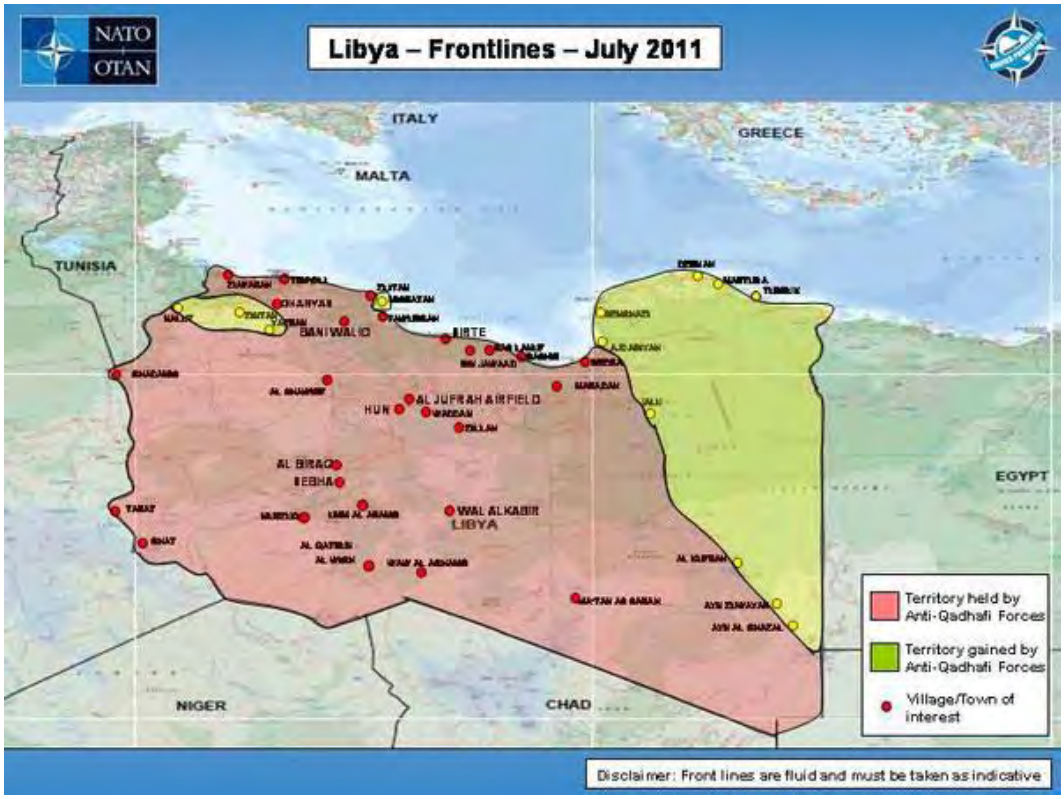
APPENDIX D
LIBYA – FRONTLINE PROGRESSION

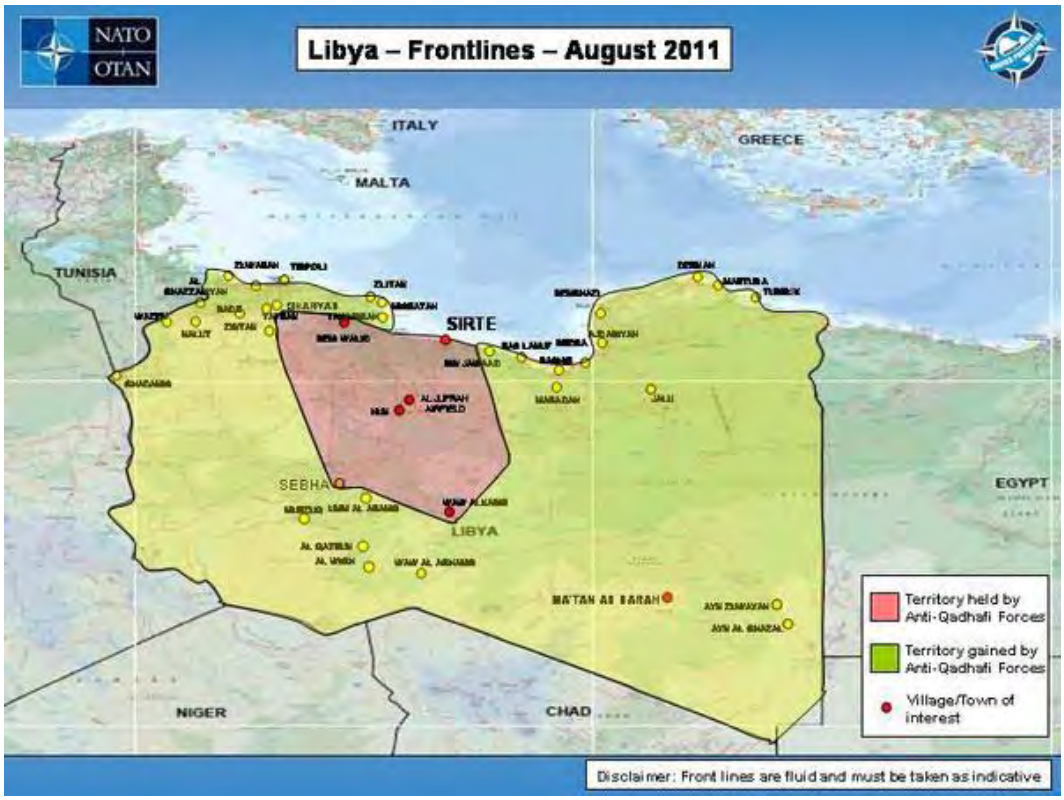


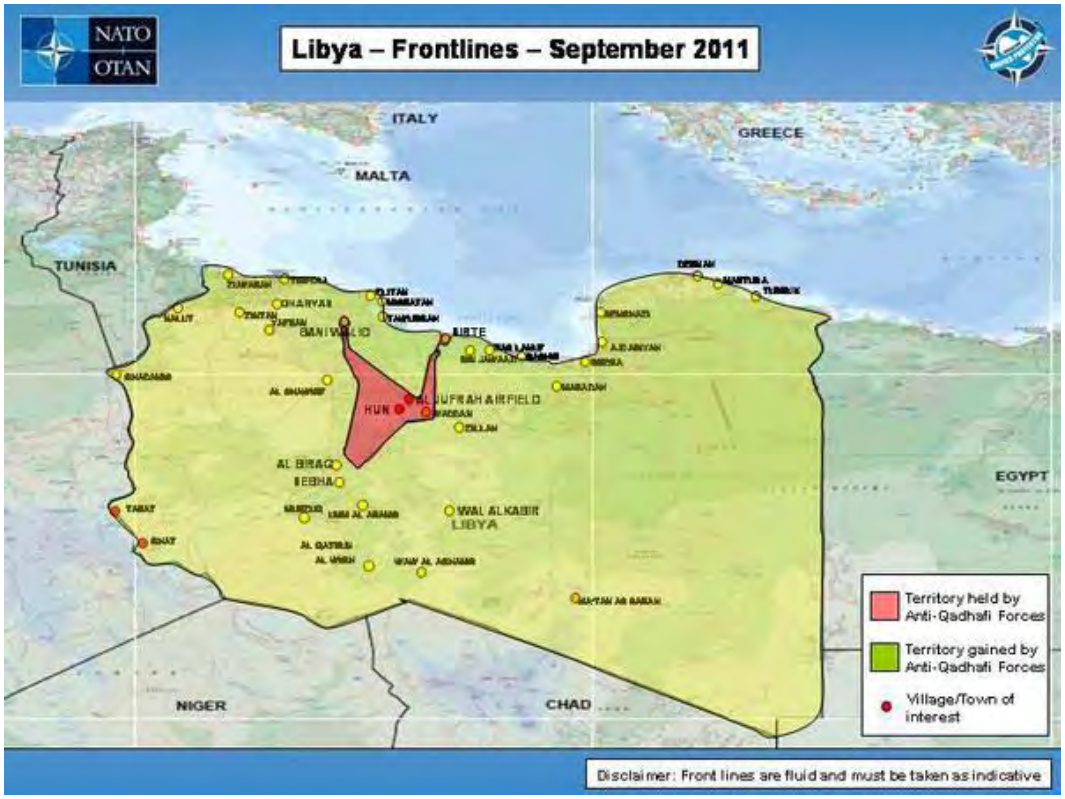


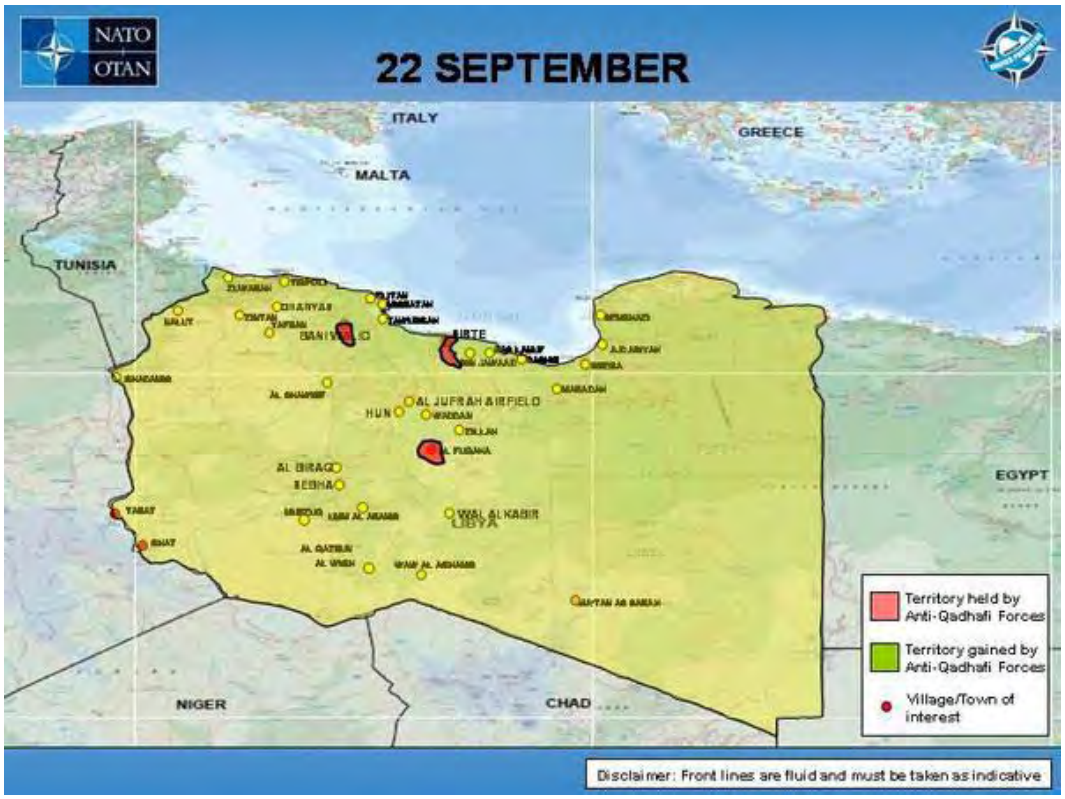

NATO
OTAN
Libya – Frontlines – May 2011
ITALY
MALTA
GREECE
TUNISIA
BANIWALID
SIRTE
AL JUFRAH AIRFIELD
HUN
AL BIRAQ
EBHA
WAL AL KABIR
LIBYA
EGYPT
NIGER
CHAD
Territory held by Anti-Qadhafi Forces
Territory gained by Anti-Qadhafi Forces
Village/Town of interest
Disclaimer: Front lines are fluid and must be taken as indicative


NATO
OTAN
Libya – Frontlines – June 2011
ITALY
MALTA
GREECE
TUNISIA
BANIWALID
SIRTE
AL JUFRAH AIRFIELD
HUN
AL BIRAQ
EBHA
WAL AL KABIR
LIBYA
EGYPT
NIGER
CHAD
Territory held by Anti-Qadhafi Forces
Territory gained by Anti-Qadhafi Forces
Village/Town of interest
Disclaimer: Front lines are fluid and must be taken as indicative


NATO
OTAN
Libya – Frontlines – July 2011
ITALY
MALTA
GREECE
TUNISIA
SIRTE
AL JUFRAH AIRFIELD
AL BIRAQ
SEBHA
WAL AL KABIR
LIBYA
EGYPT
NIGER
CHAD
Territory held by Anti-Qadhafi Forces
Territory gained by Anti-Qadhafi Forces
Village/Town of interest
Disclaimer: Front lines are fluid and must be taken as indicative


NATO
OTAN
Libya – Frontlines – August 2011
ITALY
MALTA
GREECE
TUNISIA
SIRTE
SEBHA
LIBYA
EGYPT
NIGER
CHAD
Territory held by Anti-Qadhafi Forces
Territory gained by Anti-Qadhafi Forces
Village/Town of interest
Disclaimer: Front lines are fluid and must be taken as indicative


NATO
OTAN
Libya – Frontlines – September 2011
ITALY
MALTA
GREECE
TUNISIA
EGYPT
NIGER
CHAD
AL JUFRAH AIRFIELD
AL BIRAQ
SEBHA
WAL AL KABIR
LIBYA
Territory held by Anti-Qadhafi Forces
Territory gained by Anti-Qadhafi Forces
Village/Town of interest
Disclaimer: Front lines are fluid and must be taken as indicative

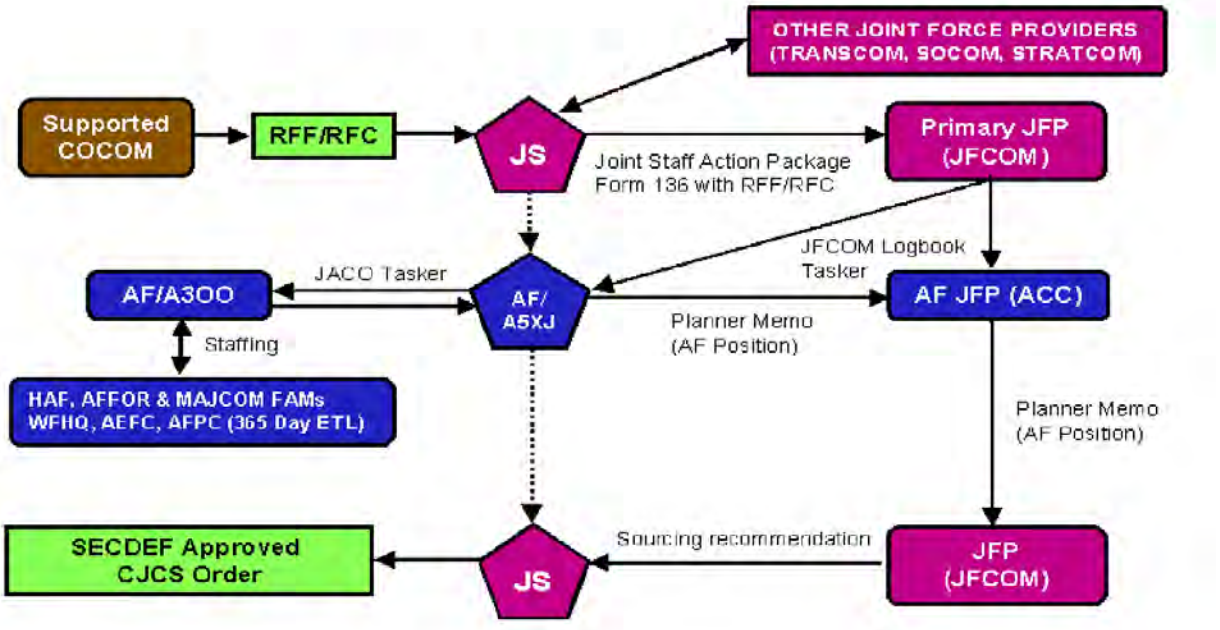

NATO
OTAN
22 SEPTEMBER
ITALY
MALTA
GREECE
TUNISIA
EGYPT
NIGER
CHAD
AL JUFRAH AIRFIELD
AL BIRAQ
SEBHA
WAL AL KABIR
LIBYA
Territory held by Anti-Qadhafi Forces
Territory gained by Anti-Qadhafi Forces
Village/Town of interest
Disclaimer: Front lines are fluid and must be taken as indicative

APPENDIX E
REQUEST FOR FORCES (RFF) AND GLOBAL FORCE MANAGEMENT (GFM) EXPLAINED

The following references and definitions were extracted from Air Force Instruction (AFI) 10-401, Air Force Operations Planning and Execution, 7 December 2006. For additional information on GFM and RFF processes refer to this instruction; AFPD 10-4, *Operations Planning: Air & Space Expeditionary Force (AEF)*, 30 Apr 09; SecDef Global Force Management (GFM) Guidance (S), 4 May 2005; and CJCSM 3122.01A, *JOPES Volume I (Planning Policies and Procedures)*, 29 Sep 06.

(from AFI 10-401)
Global Force Management (GFM). GFM is a process to align force apportionment, assignment, and allocation methodologies in support of the defense strategy and in support of joint force availability requirements; present comprehensive insight into the global availability of U.S. military forces; and provide senior decision makers a vehicle to quickly and accurately assess the impact and risk of proposed allocation, assignment, and apportionment changes.

Joint Force Provider. Joint Staff (JS) directly tasks JFCOM, as primary Joint Force Provider (JFP), or other Joint Force Providers (i.e., TRANSCOM, SOCOM, or STRATCOM), to develop recommended global sourcing solutions. This formal process sources emerging Unified Combatant commander (UCC) requirements. JFCOM endorses the RFF/RFC and forwards with any additional sourcing guidance to the Service components to determine sourcing recommendation and issues. AF/A3OO, working with HAF and MAJCOM FAMs, will develop and provide the Air Force position to ACC as the JFCOM Service component to distribute the recommended sourcing solution (including Reserve Components) to the primary JFP. ACC has a clear component role with JFCOM to assist in distributing and monitoring AF sourcing availability to execute Combatant Commander (CCDR) missions and forecast sourcing challenges or issues. (See figure below).



Request for Forces/Capabilities and Joint Staff Process. The process is initiated when the CCDR determines a requirement and submits a Request for Forces/Capability (RFF/RFC) to JS. The RFF/RFC

provides CCDRs with a means to obtain required support not already assigned or allocated to the command. Prior to the CCDR forwarding to JS, Air Force component headquarters will review all RFFs/RFCs for USAF capabilities being requested and translate the request into potential unit type codes (UTCs), Air Force Specialty Codes (AFSC), or closest organic AF capability. In response to an RFF/RFC the JS generates a draft Execute/Deployment Orders (EXORD/DEPORDs) allocating forces from a force provider to the requesting CCDR for a set period of time and sends validated RFF/RFC in a Joint Staff Action Package to JFCOM and a carbon copy to Headquarters Air Force and supporting combatant commands. Force apportionment, assignment, and allocation processes are defined in the "Global Force Management (GFM) Guidance" document; the force allocation process used to satisfy RFF/RFC is endorsed and executed with any additional sourcing guidance by JFCOM to the Service Components via a Logbook Tasker to determine sourcing recommendation and issues. Generally, this is a three step AF Service level process beginning with sourcing feasibility (action officer to action officer), formal sourcing, and culminating with an EXORD/DEPORD or Modification (MOD) to EXORD. The AF recommended sourcing solution is delivered to ACC, as AF JFP, to JFCOM for final input and to prepare rotational force schedule, rotational force allocation plan and military risk assessment for JS to submit to the SecDef for approval. Reference flow diagrams in Figure 1.4. through Figure 1.6. for detailed force provider and Air Force actions during the RFF/RFC sourcing processes.

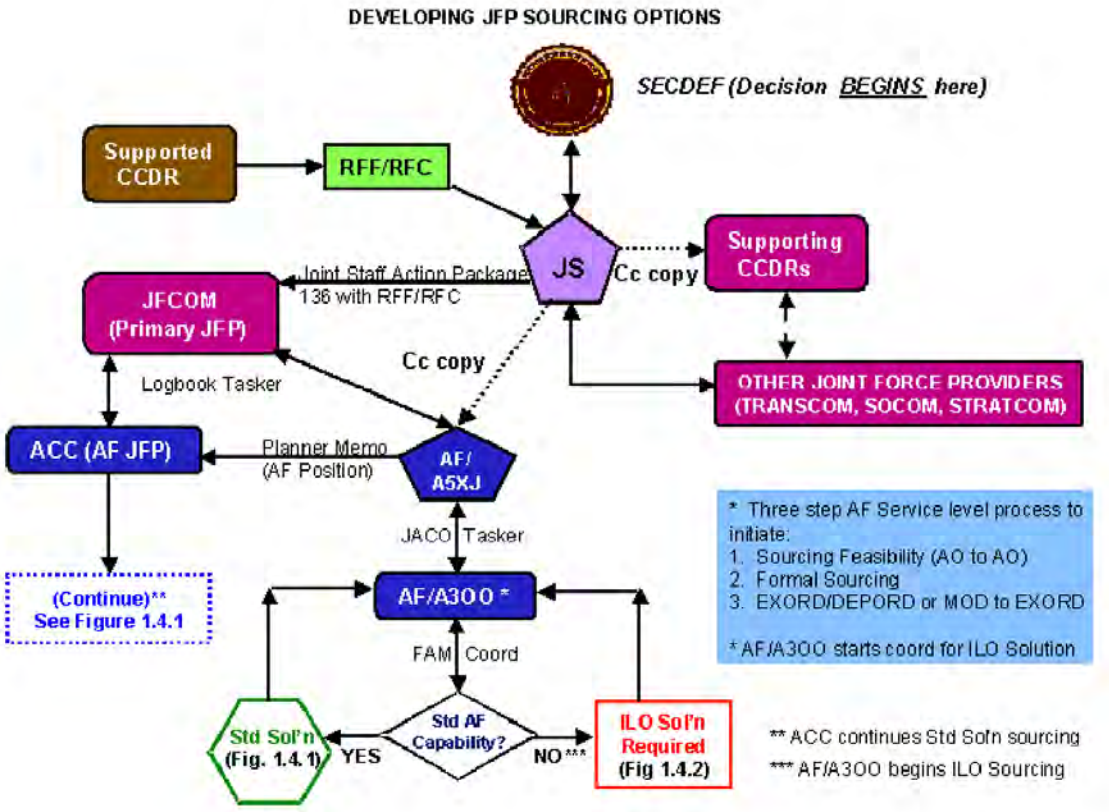


Figure 1.4 Sourcing Solution Process

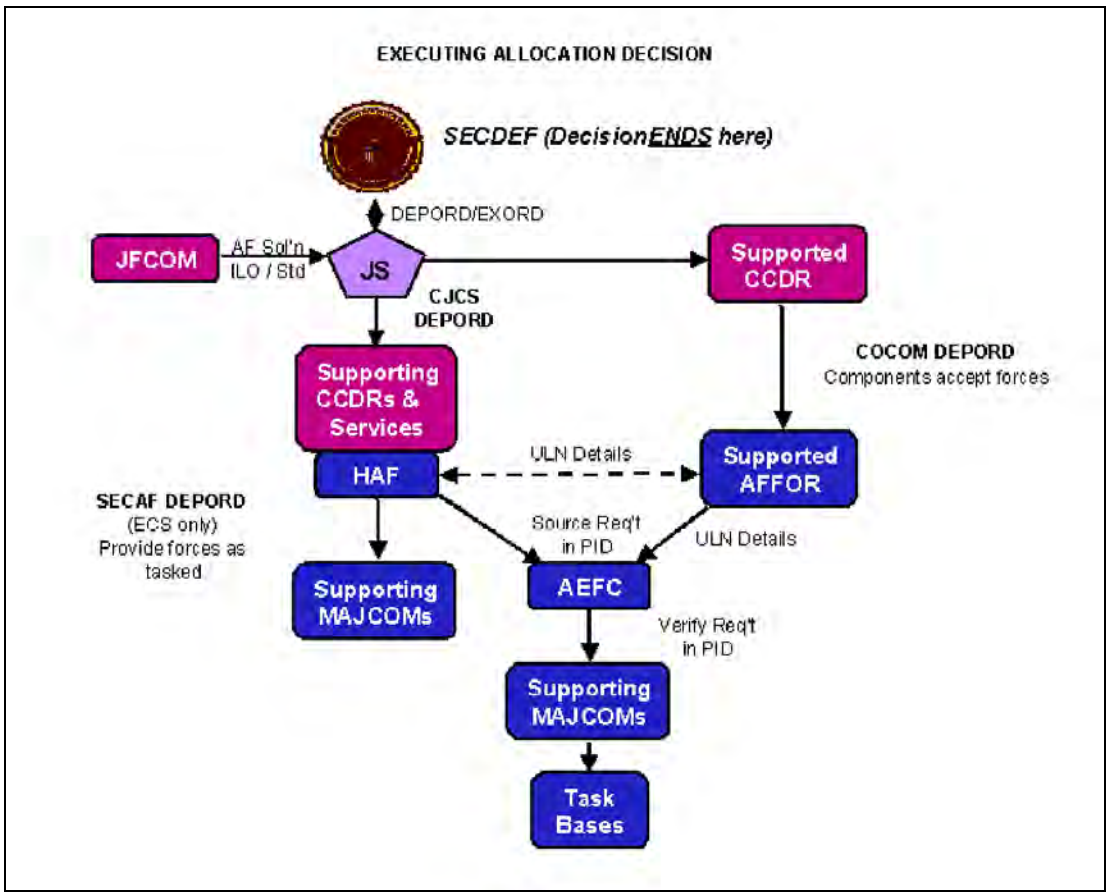


Figure 1.5 Executing Allocation Decision

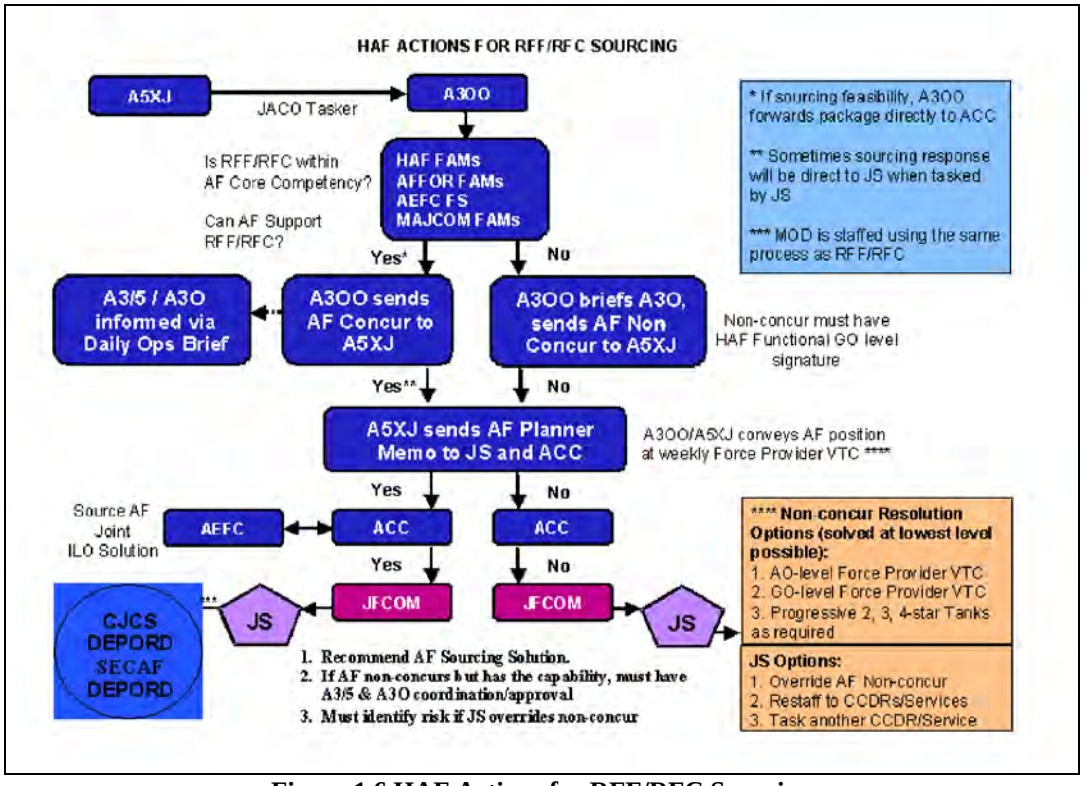
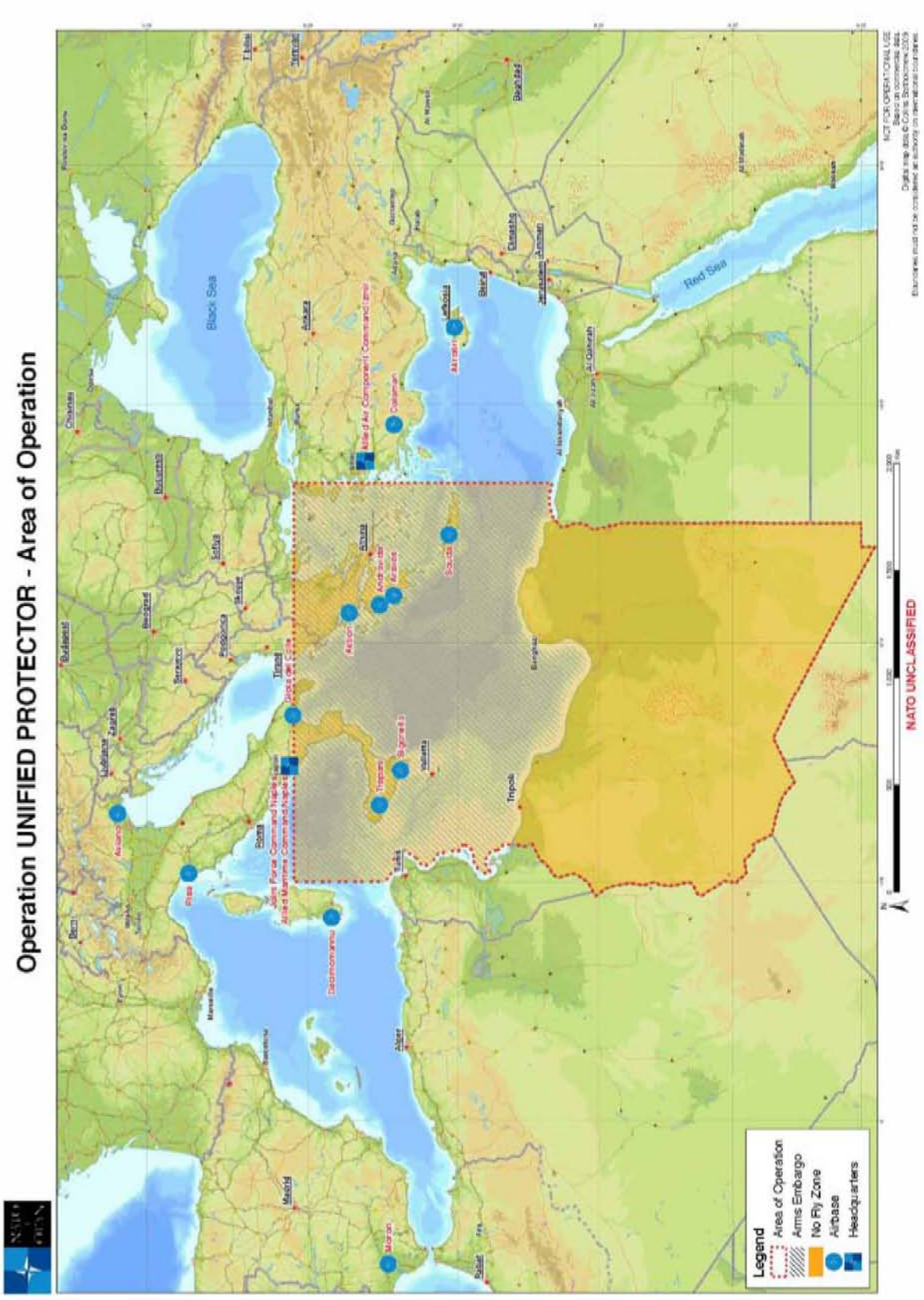


Figure 1.6 HAF Actions for RFF/RFC Sourcing

APPENDIX F
BASING LOCATIONS / AREA OF OPERATIONS



APPENDIX G
COALITION EQUIPMENT COMPARISON*

In addition to the basic communication equipment comparison chart depicted below, there were other factors which affected interoperability of the coalition. Some of these include:

- The inability of nations to obtain NATO cryptography keys. Even with compatible equipment, not having the right cryptography installed would render it useless. Obtaining these keys was a problem for non-NATO members, such as Sweden, where it became a releasability issue. It was also a problem for much of the US contingent as well, which did not routinely use the keys or have the means to rapidly obtain them.

- Again, with the Swedes, was an issue where they had Have Quick II (HQ II) installed on their Gripens, but could not get it to function.[102]

- Many of the nations that possessed HQ II did not routinely train with it and were hesitant to use it as a secondary means of communication.

- "Standard" methods of employment are not necessarily codified or agreed upon. There are doctrinal differences in the employment of essentially the same aircraft in different countries. The AWACS for example, in US doctrine "has incorporated the notion of air control (in addition to surveillance) for some time…In NATO, however, NATO Airborne Early Warning Force Command personnel have only recently begun to perform this function."[103] While this reference was made in 2000, there still exist clear differences in the proficiency and scope of control provided by one platform to another.

Aircraft Type	SATCOM	Datalink LINK-16	UHF - SECURE	VHF - SECURE	HAVE QUICK II
Belgium					
F-16A-10/15	NO	NO	YES	YES	YES
Canada					
CP-140	YES	NO Link-11	YES	YES	YES
CC-130	YES	NO	YES	YES	YES
CC-150	NO	NO	UNK	UNK	UNK
CF-188	YES	YES	YES	YES	YES
Denmark					
F-16A-10/15	NO	NO	YES	YES	YES
France					
Atlantique (Navy)	UNK	UNK	UNK	UNK	UNK
C-160	UNK	UNK	UNK	UNK	UNK
E-3F	YES	YES	YES	YES	YES
Rafale F3	NO	YES MIDS	YES	YES	NO
Mirage 2000-5	UNK	YES	YES	YES	YES
Mirage 2000D	UNK	YES	YES	YES	YES
Mirage F1CR	UNK	NO	NO	NO	NO

Italy					
KC-130J	YES	NO	YES	YES	YES
Tornado ECR/IDS	YES	YES	YES	YES	NO
Typhoon	NO	YES MIDS	YES	YES	NO
NATO					
E-3A	YES	YES	YES	YES	YES
Netherlands					
F-16A-10/15	NO	NO	YES	YES	YES
Norway					
F-16A-10/15	NO	NO	YES	YES	YES
Qatar					
Mirage 2000-5EDA	UNK	YES	YES	YES	YES
Spain					
Boeing 707 Refueler	UNK	UNK	UNK	UNK	UNK
F-18	YES	YES	YES	YES	YES
Sweden					
JAS 39C Gripen	NO	NO (TIDLS)	YES	YES	Yes, But non-functional [104]
S 102B Korpen	NO	YES	YES	NO	NO
UAE					
F-16E	NO	NO	YES	YES	YES
Mirage 2000-9	UNK	YES	YES	YES	YES
UK					
Hercules C4/C5	YES	NO	YES	YES	YES
Nimrod R1	YES	YES	YES	YES	YES
Sentinel R1	YES	YES	YES	YES	YES
E-3D	YES	YES	YES	YES	YES
Tornado GR4	NO	NO	YES	YES	YES
Typhoon	NO	YES MIDS	YES	YES	NO
USA					
F-15E	NO	YES	YES	YES	YES
F-16C-25/30/32/40/42/50/52	NO	YES	YES	YES	YES
KC-10	YES	NO	YES	NO	YES
KC-135	YES	NO	YES	YES	YES
E-3B/C	YES	YES	YES	YES	YES
E-8	YES	YES	YES	YES	YES
RC-135	YES	YES	YES	YES	YES
EA-6B	YES	YES MIDS	YES	YES	YES

* Participant aircraft data gathered from GlobalSecurity.org and Wikipedia.com; aircraft equipment obtained from Janes at jawa.janes.com and other open sources

APPENDIX H
COLLATERAL DAMAGE

"We have carried out this operation very carefully, without confirmed casualties." – statement made by Anders Rasmussen, Secretary General of NATO, in November 2011[105]

The most recent figures from Libya's health ministry show 856 civilians have been killed in NATO air raids since they began in March. – as reported by Huffington Post on 20 June 2011[106]

The remarks above clearly indicate that there is a wide disparity in the number of civilian casualties inflicted as a result of the US/NATO air campaign. Most reports now have the figure somewhere between 40 and 70 civilian deaths. Over time, that number may go up, but in the end, the true figure will never accurately be attained. The difficulty in determining with any degree of certainty the extent of collateral damage is the result of several factors. First, the lack of persistent ISR coverage and coalition troops on the ground prevented timely and accurate battle damage assessments (BDA) from occurring. As discussed in this paper, due to political and military restraints these resources were either not available or not employed. This is typically how a force is able to obtain measures of effectiveness. The second factor can be attributed to the indistinguishability between pro-Qaddafi forces, the rebels they were fighting, and civilians. The rebels and loyalist forces alike, used common weapons and tactics. Rebels started using military equipment when it became available, and loyalists, trying to avoid being targeted by alliance air forces, elected to use pickup trucks, further blurring the lines between the forces in conflict.[107] This likely resulted in the accidental targeting and destruction of rebel forces, which likely are not figured into civilian casualty estimates. Additionally, much of the fighting took place in urban environments around and amongst the civilian population.

To account for these factors, the NATO CFACC, Lieutenant General Ralph Jodice II, described "an excruciating sequence of steps and checks applied to all strike missions" to include using precision munitions 100 percent of the time and selecting weapons with the lowest yield of explosive effect.[108] As an LNO present at both the US AOC in Ramstein AB and the NATO CAOC in Poggio Renatico, I can attest to the degree of caution exercised and care taken by all players to minimize the risk of collateral damage. Pilots would be certain to visually identify any targets they

planned to strike, and in some cases, worked to verify the exact direction that artillery was being fired to confirm whether it was Rebels or pro-Qaddafi forces firing. Red Card Holders and decision makers in the CAOC were also extremely wary, possibly to a detriment of operations, of clearing a strike asset to drop on a target. The use of the word "excruciating" in describing the process is appropriate. Helicopters were also employed heavily, given their ability to loiter over a target longer. Finally, many airborne platforms used cross-cueing synergy to nominate and validate targets.

For the amount of ordinance dropped (estimated to be 7,700 bombs or missiles), particularly in such close proximity of combating forces, on non-traditional military targets, and in urban environments, the limits on collateral damage are nothing short of remarkable.[109] Civilian death in any conflict is indeed tragic, but in all likelihood unavoidable. One must consider the death toll caused by Qaddafi's own forces in trying to put down the rebellion. Without coalition intervention, how many more it would have been killed had he been able to continue unrestricted shelling of cities and his vow for "no mercy or compassion" for opposition forces?[110] Reporters' claims of "NATO's depraved disregard for Libyan civilian casualties" are sensationalized mistruths by would-be conspiracy theorists seeking attention.[111] If anything, the care exercised and limits on civilian casualties during the coalition's intervention in Libya has set a standard that will be difficult to attain in future conflicts.

End Notes

[1] "Last Air Mission of Unified Protector concluded," *NATO.int*, October 31, 2011, http://www.nato.int/cps/en/natolive/news_80133.htm (accessed on December 2, 2011).
[2] Robert Marquand, "NATO operation in Libya ends after 7 months, could it be a model?," *Christian Science Monitor*, October 31, 2011, http://www.csmonitor.com/World/Global-News/2011/1031/NATO-operation-in-Libya-ends-after-7-months-could-it-be-a-model (accessed January 3, 2011).
[3] Barak Obama, Speech delivered at the National Defense University, Washington, DC, March 28, 2011.
[4] Jon Hilsenrath, "Gates Says Libya Not Vital National Interest," *The Wall Street Journal*, March 27, 2011, http://online.wsj.com/article/SB10001424052748704308904576226704261420430.html (accessed January 19, 2012).
[5] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): A Case Study in Command and Control* (Suffolk, VA: JCOA, 4 October 2011), 2.
[6] Margaret H. Woodward, "Defending America's Vital National Interests in Africa," (speech, Air Force Association's 2011 Air & Space Conference & Technology Exposition, National Harbor, MY, 21 September 2011). http://www.af.mil/information/speeches/speech.asp?id=671 (accessed January 5, 2012).
[7] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): A Case Study in Command and Control*, 9.
[8] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary* (Suffolk, VA: JCOA, 21 September 2011), 4.
[9] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 7.
[10] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 7.
[11] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 5.
[12] Margaret H. Woodward, "Defending America's Vital National Interests in Africa."
[13] Margaret H. Woodward, "Defending America's Vital National Interests in Africa."
[14] John A. Tirpak, "Lessons From Libya," *Air Force Magazine*, December 2011, 36.
[15] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 5.
[16] John A. Tirpak, "Lessons From Libya," 38.
[17] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 19.
[18] U.S. Congress, Office of Technology Assessment, *New Technology for NATO: Implementing Follow-On Force Attack*, (Washington, DC: U.S. Government Printing Office, June 1987), 118. Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): A Case Study in Command and Control*, 11.
[19] Andrew Shelton, "Operation ODYSSEY DAWN: The USAFE Perspective," Briefing by 3 AF/A9, Lessons Learned Analyst, October 25, 2011.
[20] John A. Tirpak, "Lessons From Libya," 35.
[21] John A. Tirpak, "Lessons From Libya," 35.
[22] Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (New York, NY: Oxford University Press, 1971), 84.

[23] Richard F. Bird and Don Kallgren, "Extending the Mission: NATO AEW Beyond Line-of-Sight Airborne IP Communications," NATO. http://www.nc3a.nato.int/SiteCollectionDocuments/MP-IST-092-13.pdf (accessed January 3, 2012).
[24] Rita Boland, "Building Bridges Between Allies, Old and New," *SIGNAL Magazine*, September 2010, http://www.afcea.org/signal/articles/templates/SIGNAL_Article_Template.asp?articleid =2382&zoneid=47 (accessed January 9, 2012).
[25] Bill Sweetman, "Reluctant Warriors: Fighter conference reviews lessons from Libya campaign," *Defense Technology International*, December 2011.
[26] Myron Hura and others, "Interoperability: A Continuing Challenge in Coalition Air Operations," RAND Monograph Report (Santa Monica, CA: RAND Corporation, 2000), iii.
[27] Isabelle François, "NATO and the Arab Spring," *Transatlantic Current*, October 2011, http://www.ndu.edu/inss/docUploaded/Transatlantic%20Current%201.pdf (accessed on December 27, 2011).
[28] Julian E. Barnes and Adam Entous, "NATO Air Strategy Gains Renewed Praise," *The Wall Street Journal*, October 21, 2011, http://online.wsj.com/article/ SB10001424052970203752604576643531745513712.html (accessed on December 27, 2011).
[29] Steven Erlanger, "Libya's Dark Lesson for NATO," *New York Times*, September 3, 2011, http://www.nytimes.com/2011/09/04/sunday-review/what-libyas-lessons-mean-for-nato.html?pagewanted=all (accessed January 20, 2012).
[30] John Barry, "Lessons of Libya for Future Western Military Forays," *European Affairs,* August 2011, http://www.europeaninstitute.org/EA-August-2011/lessons-of-libya-for-future-western-military-forays.html (accessed December 2, 2011).
[31] Thom Shanker, "Defense Secretary Warns NATO of 'Dim' Future," *NYTimes.com*, June 10, 2011, http://www.nytimes.com/2011/06/11/world/europe/11gates.html (accessed January 19, 2012).
[32] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 18.
[33] John Barry, "Lessons of Libya for Future Western Military Forays."
[34] Ben Barry, "Libya's Lessons," *The International Institute for Strategic Studies, Survival: Global Politics and Strategy*, Vol. 53, no. 5 (October – November 2011): 11.
[35] Francis Tusa, "Libya Reveals NATO Readiness Highs and Lows," *AviationWeek.com*, December 5, 2011, http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=dti&id=news/ dti/2011/12/01/DT_12_01_2011_p34-390579.xml (accessed January 9, 2012).
[36] Steven Erlanger, "Libya's Dark Lesson for NATO."
[37] Bill Sweetman, Angus Batey, and Christina Mackenzie, "U.K., France Fine-tune Libyan Air Ops," *AviationWeek.com*, July 4, 2011, http://www.aviationweek.com/aw/jsp_includes/ articlePrint.jsp?headLine=null&storyID=news/dti/2011/06/01/DT_06_01_2011_p32-323773.xml (accessed January 9, 2012).
[38] Michael Clarke and others, *Accidental Heroes: Britain, France and the Libya Operation*, (London: Royal United Services Institute, September 2011), 6.
[39] Michael W. Lamb Sr., "Operation Allied Force: Golden Nuggets for Future Campaigns," *Air War College, Maxwell Paper No. 27* (August 2002): 1-2.
[40] Ben Barry, "Libya's Lessons," 11.
[41] Andrew Tilghman, "U.S. official: NATO military capability ebbing," *AirForceTimes.com*, December 2, 2011, http://www.airforcetimes.com/news/2011/12/military-nato-military-capability-ebbing-120211w/ (accessed January 5, 2012).
[42] Jim Garamone, "NATO makes smooth transition in Libya operations," *Air Force News Service*, April 6, 2011, http://www.af.mil/news/story.asp?id=123250401 (accessed on December 27, 2011).

[43] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 19.
[44] Amy McCullough, "The Libya Mission," *Air Force Magazine*, August 2011, 32. http://www.airforce-magazine.com/MagazineArchive/Documents/2011/August%202011/0811mission.pdf (accessed January 9, 2012).
[45] AFTTP 3-3.AOC, *Operational Employment – Air and Space Operations Center (U)*. 1 November 2007.
[46] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 17.
[47] Dave Ehredt, "Command and Control – Exploring Alternatives: The Realities of Two C2 Models for Air Power Proponents," *The Journal of the JAPCC*, no. 14 (October 2011), http://www.japcc.de/fileadmin/user_upload/journal/Edition_14/20111014_-_Journal_Ed-14_web.pdf (accessed December 2, 2011)
[48] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 18.
[49] W. Bruce Weinrod and Charles L. Barry, *NATO Command Structure: Considerations for the Future* (Fort Lesley J. McNair, Washington, DC: National Defense University Center for Technology and National Security Policy, 2010), 8. http://www.ndu.edu/CTNSP/docUploaded/DTP%2075%20NATO%20Command%20Structure.pdf (accessed January 9, 2012).
[50] Paul Smyth, "Libya: Is NATO Doing Enough?," *RUSI.org*, April 6, 2011, http://www.rusi.org/go.php?structureID=commentary&ref=C4DA85C7E0FB14 (accessed January 9, 2012).
[51] Kori Schake, "Lessons of the Libya War," *Defining Ideas* (October 13, 2011), http://www.hoover.org/publications/defining-ideas/article/96531 (accessed on December 2, 2011).
[52] Isabelle François, "NATO and the Arab Spring."
[53] Amy McCullough, "The Libya Mission," 32.
[54] Michael W. Lamb Sr., "Operation Allied Force: Golden Nuggets for Future Campaigns," 38.
[55] AFP, "After Libya, U.S. cannot bail out NATO shortfalls: Panetta," *Al Arabiya News*, October 6, 2011, http://www.alarabiya.net/articles/2011/10/06/170390.html (accessed 2 December 2011).
[56] Steven Erlanger, "Libya's Dark Lesson for NATO."
[57] W. Bruce Weinrod and Charles L. Barry, *NATO Command Structure: Considerations for the Future*, 8.
[58] Daniel L. Haulman, *One Hundred Years of Flight: USAF Chronology of Significant Air and Space Events 1903-2002* (Maxwell AFB, AL: Air University Press, 2003), 8.
[59] Patrick Cockburn, "NATO in Libya has failed to learn costly lessons of Afghanistan," *The Independent*, July 24, 2011, http://www.independent.co.uk/opinion/commentators/patrick-cockburn-nato-in-libya-has-failed-to-learn-costly-lessons-of-afghanistan-2319539.html (accessed December 2, 2011).
[60] Karl Mueller, "Book Essay, Airpower: Two Centennial Appraisals," *Strategic Studies Quarterly*, Vol. 5, No. 4 (Winter 2011), http://www.au.af.mil/au/ssq/2011/winter/mueller.pdf (accessed 27 December 2011).
[61] Ben Barry, "Libya's Lessons," 11.
[62] Kori Schake, "Lessons of the Libya War," *Defining Ideas* (October 13, 2011), http://www.hoover.org/publications/defining-ideas/article/96531 (accessed on December 2, 2011).
[63] Kori Schake, "Lessons of the Libya War."
[64] Robert Farley, "Over the Horizon: Drawing the Right Lessons on Airpower from Libya," *World Politics Review*, October 26, 2011, http://www.worldpoliticsreview.com/articles/10458/over-the-horizon-drawing-the-right-lessons-on-airpower-from-libya (accessed on December 2, 2011).

[65] Robert Farley, "Over the Horizon: Drawing the Right Lessons on Airpower from Libya."
[66] Charles A. Horner, "Air Power Could Be Enough in Libya," *The Wall Street Journal*, March 24, 2011.
[67] Alexander Nicoll, ed., "Early military lessons from Libya," *Strategic Comments*, volume 17, no. 34 (September 2011): 1-3. http://www.iiss.org/publications/strategic-comments/past-issues/volume-17-2011/september/libya-early-military-lessons/ (accessed November 2, 2011).
[68] Alexander Nicoll, ed., "Early military lessons from Libya," 1-3.
[69] Christian F. Anrig, "Allied Air Power over Libya: A Preliminary Assessment," *Air & Space Power Journal*, (Winter 2011): 104.
[70] US Air Force. Air Force Doctrine Document 1 – Air Force Basic Doctrine, Organization, and Command. October 14, 2011.
[71] US Air Force. Air Force Doctrine Document 1 – Air Force Basic Doctrine, Organization, and Command.
[72] Robert Farley, "Over the Horizon: Drawing the Right Lessons on Airpower from Libya."
[73] Mark Desens, Commander of 26 MEU during OOD, personal interview conducted on December 7, 2011.
[74] Robert Farley, "Over the Horizon: Drawing the Right Lessons on Airpower from Libya."
[75] Mark Desens, interview.
[76] Trish Turner, "McCain calls for air strikes against Syria's Assad," *Fox News.com*, March 5, 2012, http://www.foxnews.com/politics/2012/03/05/mccain-calls-for-air-strikes-against-syrias-assad/ (accessed March 19, 2012).
[77] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 2.
[78] Khaled Mahmoud, "Gaddafi ready for Libya's "Day of Rage"," *Asharq Alawsat*, February 9, 2011, http://www.asharq-e.com/news.asp?section=1&id=24095 (accessed January 17, 2012).
[79] Reuters, "Popular uprising: Qaddafi vows to crush revolt," *The Express Tribune*, February 22, 2011, http://tribune.com.pk/story/122267/eastern-libya-falls-to-anti-gaddafi-rebels/ (accessed January 17, 2012).
[80] United Nations Security Council, *Resolution 1970 (2011)*, February 26, 2011, http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N11/245/58/PDF/N1124558.pdf?OpenElement (accessed on December 2, 2011)
[81] United Nations Department of Public Information, "In swift, decisive action, Security Council imposes tough measures on Libyan regime, adopting Resolution 1970 in wake of crackdown on protestors," *UN.org*, February 26, 2011, http://www.un.org/News/Press/docs/2011/sc10187.doc.htm (accessed January 17, 2012).
[82] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 2.
[83] Jeremiah Gertler, *Operation Odyssey Dawn (Libya): Background and Issues for Congress*, CRS Report for Congress R41725 (Washington, DC: Congressional Research Service, March 30, 2011), 15.
[84] Jeremiah Gertler, *Operation Odyssey Dawn (Libya): Background and Issues for Congress*, 6.
[85] New York Times, "Libya – Revolution and Aftermath," *NYTimes.com*, January 9, 2012, http://topics.nytimes.com/top/news/international/countriesandterritories/libya/index.html (accessed January 9, 2012).
[86] New York Times, "Libya – Revolution and Aftermath."

[87] Oliver Poole, "No let-up as Gaddafi jet bombs city of 660,000," *London Evening Standard*, March 18, 2011, http://www.thisislondon.co.uk/standard/article-23933430-no-let-up-as-gaddafi-jets-bomb-city-of-660000.do (accessed January 18, 2012).
[88] Mohammed Abbas, "Gaddafi advances, no-fly diplomacy falters," *Reuters Africa*, March 16, 2011, http://af.reuters.com/article/topNews/idAFJOE72F08X20110316 (accessed January 18, 2012).
[89] Agencies, "Gaddafi Forces Threaten Benghazi," *Arab Times.com*, March 16, 2011, http://www.arabtimesonline.com/NewsDetails/tabid/96/smid/414/ArticleID/166805/reftab/96/t/Gaddafi-forces-threaten-Benghazi/Default.aspx (accessed January 19, 2012).
[90] Jeremiah Gertler, *Operation Odyssey Dawn (Libya): Background and Issues for Congress*, 1.
[91] Michael Clarke and others, *Accidental Heroes: Britain, France and the Libya Operation*, (London: Royal United Services Institute, September 2011), 4.
[92] Jeremiah Gertler, *Operation Odyssey Dawn (Libya): Background and Issues for Congress*, 15.
[93] Jeremiah Gertler, *Operation Odyssey Dawn (Libya): Background and Issues for Congress*, 17.
[94] Michael Clarke and others, *Accidental Heroes: Britain, France and the Libya Operation*, 4.
[95] New York Times, "Libya – Revolution and Aftermath."
[96] Joint and Coalition Operational Analysis, *Libya: Operation Odyssey Dawn (OOD): Executive Summary*, 4.
[97] Michael Clarke and others, *Accidental Heroes: Britain, France and the Libya Operation*, 7.
[98] Thom Shanker, "Defense Secretary Warns NATO of 'Dim' Future."
[99] Ben Barry, "Libya's Lessons," 5.
[100] Michael Clarke and others, *Accidental Heroes: Britain, France and the Libya Operation*, 2.
[101] Rupert Wingfield-Hayes, "Libya unrest: Defiant Gaddafi vows 'death or victory'," *BBC.co.uk*, August 24, 2011, http://www.bbc.co.uk/news/world-africa-14641572 (accessed on January 19, 2012).
[102] Alert 5, "Libya campaign exposed glitch in Gripen's radio," *Alert5.com*, November 11, 2011, http://alert5.com/2011/11/11/libya-campaign-exposed-glitch-in-gripens-radio/ (accessed February 22, 2012).
[103] Myron Hura and others, "Interoperability: A Continuing Challenge in Coalition Air Operations," RAND Monograph Report (Santa Monica, CA: RAND Corporation, 2000), 44.
[104] Alert 5, "Libya campaign exposed glitch in Gripen's radio."
[105] C.J. Chivers and Eric Schmitt, "In Strikes on Libya by NATO, an Unspoken Civilian Toll," *NYTimes.com*, December 17, 2011, http://www.nytimes.com/2011/12/18/world/africa/scores-of-unintended-casualties-in-nato-war-in-libya.html?_r=2 (accessed January 9, 2012).
[106] Adam Schreck and Hadeel Al-Shalchi, "Libya Says NATO Bombed Residential Area in Tripoli, Killed Civilians," *Huffington Post.com*, June 20, 2011, http://www.huffingtonpost.com/2011/06/19/libya-nato-bombing-civilian-casualties_n_879903.html (accessed January 9, 2012).
[107] C.J. Chivers and Eric Schmitt, "In Strikes on Libya by NATO, an Unspoken Civilian Toll."
[108] John A. Tirpak, "Lessons From Libya," 37.
[109] C.J. Chivers and Eric Schmitt, "In Strikes on Libya by NATO, an Unspoken Civilian Toll."
[110] Oliver Poole, "No let-up as Gaddafi jet bombs city of 660,000," *London Evening Standard*, March 18, 2011, http://www.thisislondon.co.uk/standard/article-23933430-no-let-up-as-gaddafi-jets-bomb-city-of-660000.do (accessed January 18, 2012).
[111] Glen Ford, "NATO's Depraved Disregard for Libyan Civilian Casualties," Black Agenda Report.com, December 21, 2011, http://blackagendareport.com/content/natos-depraved-disregard-libyan-civilian-casualties (accessed February 21, 2012).

Bibliography

Abbas, Mohammed. "Gaddafi advances, no-fly diplomacy falters." *Reuters Africa*, March 16, 2011. http://af.reuters.com/article/topNews/idAFJOE72F08X20110316 (accessed January 18, 2011).

AFP. "After Libya, U.S. cannot bail out NATO shortfalls: Panetta." Al Arabiya News, October 6, 2011. http://www.alarabiya.net/articles/2011/10/06/170390.html (accessed December 2, 2011).

Agencies. "Gaddafi Forces Threaten Benghazi." Arab Times.com, March 16, 2011. http://www.arabtimesonline.com/NewsDetails/tabid/96/smid/414/ArticleID/166805/reftab/96/t/Gaddafi-forces-threaten-Benghazi/Default.aspx (accessed January 19, 2012).

Alert 5. "Libya campaign exposed glitch in Gripen's radio." Alert5.com. November 11, 2011. http://alert5.com/2011/11/11/libya-campaign-exposed-glitch-in-gripens-radio/ (accessed February 22, 2012).

Anrig, Christian F. "Allied Air Power over Libya: A Preliminary Assessment." Air & Space Power Journal. (Winter 2011): 89-109.

Auslin, Michael. "Air Power: Lessons from Libya." The Wall Street Journal, October 25, 2011. http://online.wsj.com/article/SB10001424052970204485304576643103991241520.html (accessed December 27, 2011).

Barnes, Julian E. and Adam Entous. "NATO Air Strategy Gains Renewed Praise." The Wall Street Journal, October 21, 2011. http://online.wsj.com/article/SB10001424052970203752604576643531745513712.html (accessed on December 27, 2011).

Barry, Ben. "Libya's Lessons." The International Institute for Strategic Studies, Survival: Global Politics and Strategy vol. 53, no. 5 (October – November 2011): 5-14.

Barry, John. "Lessons of Libya for Future Western Military Forays." European Affairs, August 2011. http://www.europeaninstitute.org/EA-August-2011/lessons-of-libya-for-future-western-military-forays.html (accessed December 2, 2011).

BBC News. "UK sells 72 retired Harrier jump jets for $180m to US." BBC.co.uk, 24 November 2011. http://www.bbc.co.uk/news/uk-15876745 (accessed January 5, 2012).

Bird, Richard F. and Don Kallgren. "Extending the Mission: NATO AEW Beyond Line-of-Sight Airborne IP Communications." NATO. http://www.nc3a.nato.int/SiteCollectionDocuments/MP-IST-092-13.pdf (accessed January 3, 2012).

Boland, Rita. “Building Bridges Between Allies, Old and New.” SIGNAL Magazine, September 2010. http://www.afcea.org/signal/articles/templates/SIGNAL_Article_Template.asp?articleid=2382&zoneid=47 (accessed January 9, 2012).

Chivers, C.J., and Eric Schmitt. “In Strikes on Libya by NATO, an Unspoken Civilian Toll.” NYTimes.com, December 17, 2011. http://www.nytimes.com/2011/12/18/world/africa/scores-of-unintended-casualties-in-nato-war-in-libya.html?_r=2 (accessed January 9, 2012).

Clarke, Michael. “Curious victory for NATO in Libya.” RUSI.org, August 24, 2011. http://www.rusi.org/analysis/commentary/ref:C4E53CF030EB3B (accessed January 9, 2012).

Clarke, Michael, Malcolm Chalmers, Jonathan Eyal, Shashank Joshi, Mark Phillips, Elizabeth Quintana and Lee Willett. Accidental Heroes: Britain, France and the Libya Operation. London: Royal United Services Institute, September 2011.

Cockburn, Patrick. “NATO in Libya has failed to learn costly lessons of Afghanistan.” The Independent, July 24, 2011. http://www.independent.co.uk/opinion/commentators/patrick-cockburn-nato-in-libya-has-failed-to-learn-costly-lessons-of-afghanistan-2319539.html (accessed December 2, 2011).

Cordesman, Anthony H. The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo. Westport, CT: Praeger Publishers, 2001.

Daalder, Ivo H. and Michael E. O’Hanlon. Winning Ugly: NATO’s War to Save Kosovo. Washington DC: Brookings Institution Press, 2000.

de La Chica Camúñez, Manuel. “The Principles of War: Back to Basics?.” The Journal of the JAPCC, no. 14 (October 2011): 45-48. http://www.japcc.de/fileadmin/user_upload/journal/Edition_14/20111014_-_Journal_Ed-14_web.pdf (accessed December 2, 2011)

de Silva, Richard. “Lessons from Libya: Gaddafi’s tactics – and NATO’s Response.” DefenceIQ.com, October 25, 2011. http://www.defenceiq.com/air-forces-and-military-aircraft/articles/nato-air-power-lessons-from-libya/ (accessed January 5, 2012).

Defense Tech. “The Royal Navy Wants Its Carriers Back.” Defensetech.org, 12 May 2011. http://www.flightglobal.com/news/articles/libya-harrier-retirement-was-unavoidable-says-raf-chief-355669/ (accessed January 5, 2012).

Ehredt, Dave. “Command and Control – Exploring Alternatives: The Realities of Two C2 Models for Air Power Proponents.” The Journal of the JAPCC, no. 14 (October 2011): 38-40. http://www.japcc.de/fileadmin/user_upload/journal/Edition_14/20111014_-_Journal_Ed-14_web.pdf (accessed December 2, 2011)

Erlanger, Steven. “Libya’s Dark Lesson for NATO.” New York Times. September 3, 2011. http://www.nytimes.com/2011/09/04/sunday-review/what-libyas-lessons-mean-for-nato.html?pagewanted=all (accessed January 20, 2012).

Farley, Robert. “Over the Horizon: Drawing the Right Lessons on Airpower from Libya.” World Politics Review, October 26, 2011. http://www.worldpoliticsreview.com/articles/10458/over-the-horizon-drawing-the-right-lessons-on-airpower-from-libya (accessed on December 2, 2011).

Ford, Glen. “NATO’s Depraved Disregard for Libyan Civilian Casualties.” Black Agenda Report.com. December 21, 2011. http://blackagendareport.com/content/natos-depraved-disregard-libyan-civilian-casualties (accessed February 21, 2012).

François, Isabelle. “NATO and the Arab Spring.” Transatlantic Current, October 2011. http://www.ndu.edu/inss/docUploaded/Transatlantic%20Current%201.pdf (accessed on December 27, 2011).

Garamone, Jim. “NATO makes smooth transition in Libya operations.” Air Force News Service, April 6, 2011. http://www.af.mil/news/story.asp?id=123250401 (accessed on December 27, 2011).

Gertler, Jeremiah. Operation Odyssey Dawn (Libya): Background and Issues for Congress. CRS Report for Congress R41725. Washington, DC: Congressional Research Service, March 30, 2011.

Gray, Peter W. “The Balkans: An Air Power Basket Case?.” In Air Power History: Turning Points from Kitty Hawk to Kosovo, edited by Sebastian Cox and Peter Gray, 330-344. Portland, OR: Frank Cass Publishers, 2002.

Haulman, Daniel L. One Hundred Years of Flight: USAF Chronology of Significant Air and Space Events 1903-2002. Maxwell AFB, AL: Air University Press, 2003.

Headquarters, United States Air Force. “Modernizing the Air and Space Operations Center Weapons System.” 2011. A9L Studies & Analyses, Assessments and Lessons Learned Branch, Washington DC.

Hebert, Adam J. “Libya: Victory Through Airpower.” Air Force Magazine, December 2011. 4. http://www.airforce-magazine.com/MagazineArchive/Pages/2011/December%202011/1211edit.aspx (accessed January 9, 2012).

Hilsenrath, Jon. “Gates Says Libya Not Vital National Interest.” The Wall Street Journal, March 27, 2011. http://online.wsj.com/article/SB10001424052748704308904576226704261420430.html (accessed January 19, 2012).

Horner, Charles A. “Air Power Could Be Enough in Libya.” The Wall Street Journal, March 24, 2011.

Hura, Myron, Gary McLeod, James Schneider, Daniel Gonzales, Daniel M. Norton, Jody Jacobs, Kevin M. O'Connell, William Little, Richard Mesic, Lewis Jamison, “Interoperability: A Continuing Challenge in Coalition Air Operations,” RAND Monograph Report. Santa Monica, CA: RAND Corporation, 2000.

Johnson, David E. Learning Large Lessons: The Evolving Roles of Ground Power and Air Power in the Post-Cold War Era. Santa Monica, CA: RAND Corporation, 2007.

Joint Air Power Competence Centre. Air-Land Integration: An Operational Assessment. Kalkar, Germany: JAPCC, September 2011.

Joint and Coalition Operational Analysis. Libya: Operation Odyssey Dawn (OOD): A Case Study in Command and Control. Suffolk, VA: JCOA, 4 October 2011.

Joint and Coalition Operational Analysis. Libya: Operation Odyssey Dawn (OOD): Executive Summary. Suffolk, VA: JCOA, 21 September 2011.

Joshi, Shashank. “Six lessons from Libya.” Conservative Middle East Council. October 13, 2011. http://cmec.org.uk/blog/six-lessons-from-libya/ (accessed December 2, 2011).

Laird, Robin. “French Libya Lessons Learned: Better Targeting, Flexible ROEs, Limits to Armed UAVs.” Aol Defense.com, September 23, 2012, http://defense.aol.com/2011/09/23/french-libya-lessons-learned-better-targeting-flexible-roes-l (accessed January 9, 2012).

Laird, Robin. “Marine Libya Lessons: Short Command-Control Links, STOVL Flexibility.” Aol Defense.com, October 6, 2011. http://defense.aol.com/2011/10/06/marine-libya-lessons-short-command-control-links-stovl-flexibi/ (accessed January 9, 2012).

Lamb, Michael W. Sr. “Operation Allied Force: Golden Nuggets for Future Campaigns.” Air War College, Maxwell Paper No. 27 (August 2002).

Lambeth, Benjamin S. NATO’s Air War for Kosovo: A Strategic and Operational Assessment. Santa Monica, CA: RAND Corporation, 2001.

London, Craig H. “LIBYA: Harrier retirement was unavoidable, says RAF chief.” Flightglobal.com, 18 April 2011. http://www.flightglobal.com/news/articles/libya-harrier-retirement-was-unavoidable-says-raf-chief-355669/ (accessed January 5, 2012).

Mahmoud, Khaled. “Gaddafi ready for Libya’s “Day of Rage”.” Asharq Alawsat, February 9, 2011. http://www.asharq-e.com/news.asp?section=1&id=24095 (accessed January 17, 2012).

Marquand, Robert. “NATO operation in Libya ends after 7 months, could it be a model?” Christian Science Monitor, October 31, 2011. http://www.csmonitor.com/World/Global-News/2011/1031/NATO-operation-in-Libya-ends-after-7-months-could-it-be-a-model (accessed January 3, 2011).

McCullough, Amy. “The Libya Mission.” Air Force Magazine, August 2011. 28-32. http://www.airforce-magazine.com/MagazineArchive/Documents/2011/August%202011/0811mission.pdf (accessed January 9, 2012).

Mueller, Karl. “Book Essay, Airpower: Two Centennial Appraisals.” Strategic Studies Quarterly, Vol. 5, No. 4 (Winter 2011). http://www.au.af.mil/au/ssq/2011/winter/mueller.pdf (accessed December 27, 2011).

Munoz, Carlo. “Abrial: NATO Closing ISR, Intel Sharing Gaps Exposed in Libya.” Aol Defense.com, November 22, 2011. http://defense.aol.com/2011/11/22/abrial-nato-closing-isr-intel-sharing-gaps-exposed-in-libya (accessed January 9, 2012).

Nardulli, Bruce R., Walter L. Perry, Bruce Pirnie, John Gordon IV, and John G. McGinn. Disjointed War: Military Operations in Kosovo, 1999. Santa Monica, CA: RAND Corporation, 2002.

NATO. “We answered the call: the end of Operation Unified Protector.” NATO.int, October 31, 2011. http://www.nato.int/cps/en/natolive/news_80435.htm (accessed on December 2, 2011).

NATO. “Last Air Mission of Unified Protector concluded.” NATO.int, October 31, 2011. http://www.nato.int/cps/en/natolive/news_80133.htm (accessed on December 2, 2011).

NATO Press and Media Operations Centre. Operation UNIFIED PROTECTOR: Final Mission Stats. Naples, Italy: Allied Joint Force Command Naples, 2011.

New York Times. “Libya – Revolution and Aftermath.” NYTimes.com, January 9, 2012. http://topics.nytimes.com/top/news/international/countriesandterritories/libya/index.html (accessed January 9, 2012).

Nicoll, Alexander, ed. “Early military lessons from Libya.” Strategic Comments, volume 17, no. 34 (September 2011): 1-3. http://www.iiss.org/publications/strategic-comments/past-issues/volume-17-2011/september/libya-early-military-lessons/ (accessed November 2, 2011).

Poole, Oliver. “No let-up as Gaddafi jet bombs city of 660,000.” London Evening Standard, March 18, 2011. http://www.thisislondon.co.uk/standard/article-23933430-no-let-up-as-gaddafi-jets-bomb-city-of-660000.do (accessed January 18, 2012).

Reuters. “Popular uprising: Qaddafi vows to crush revolt.” The Express Tribune, February 22, 2011. http://tribune.com.pk/story/122267/eastern-libya-falls-to-anti-gaddafi-rebels/ (accessed January 17, 2012).

Ritchie, Sebastian. “Air Power Victorious?: Britain and NATO Strategy during the Kosovo Conflict.” In Air Power History: Turning Points from Kitty Hawk to Kosovo, edited by Sebastian Cox and Peter Gray, 318-329. Portland, OR: Frank Cass Publishers, 2002.

Schake, Kori. “Lessons of the Libya War.” Defining Ideas (October 13, 2011). http://www.hoover.org/publications/defining-ideas/article/96531 (accessed on December 2, 2011).

Schreck, Adam and Hadeel Al-Shalchi. “Libya Says NATO Bombed Residential Area in Tripoli, Killed Civilians.” Huffington Post.com. June 20, 2011. http://www.huffingtonpost.com/2011/06/19/libya-nato-bombing-civilian-casualties_n_879903.html (accessed January 9, 2012).

Shanker, Thom. “Defense Secretary Warns NATO of ‘Dim’ Future.” NYTimes.com, June 10, 2011. http://www.nytimes.com/2011/06/11/world/europe/11gates.html (accessed January 19, 2012).

Smyth, Paul. “Libya: Is NATO Doing Enough?.” RUSI.org, April 6, 2011. http://www.rusi.org/go.php?structureID=commentary&ref=C4DA85C7E0FB14 (accessed January 9, 2012).

Sweetman, Bill, Angus Batey, and Christina Mackenzie. “U.K., France Fine-tune Libyan Air Ops.” AviationWeek.com, July 4, 2011. http://www.aviationweek.com/aw/jsp_includes/articlePrint.jsp?headLine=null&storyID=news/dti/2011/06/01/DT_06_01_2011_p32-323773.xml (accessed January 9, 2012).

Sweetman, Bill. “Reluctant Warriors: Fighter conference reviews lessons from Libya campaign.” Defense Technology International. December 2011.

Tilghman, Andrew. “U.S. official: NATO military capability ebbing.” AirForceTimes.com, December 2, 2011. http://www.airforcetimes.com/news/2011/12/military-nato-military-capability-ebbing-120211w/ (accessed January 5, 2012).

Tirpak, John A. “Lessons From Libya.” Air Force Magazine, December 2011.

Turner, Trish. “McCain calls for air strikes against Syria’s Assad.” Fox News.com. March 5, 2012. http://www.foxnews.com/politics/2012/03/05/mccain-calls-for-air-strikes-against-syrias-assad/ (accessed March 19, 2012).

Tusa, Francis. “Libya Reveals NATO Readiness Highs and Lows.” AviationWeek.com, December 5, 2011. http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=dti&id=news/dti/2011/12/01/DT_12_01_2011_p34-390579.xml (accessed January 9, 2012).

Tzu, Sun. The Art of War. Translated by Samuel B. Griffith. New York, NY: Oxford University Press, 1971.

United Nations. United Nations Security Council. Resolution 1970 (2011). February 26, 2011. http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N11/245/58/PDF /N1124558.pdf?OpenElement (accessed on December 2, 2011)

United Nations. United Nations Security Council. Resolution 1973 (2011). March 17, 2011. http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N11/268/39/PDF/ N1126839.pdf?OpenElement (accessed on December 2, 2011)

United Nations Department of Public Information. "In swift, decisive action, Security Council imposes tough measures on Libyan regime, adopting Resolution 1970 in wake of crackdown on protestors." UN.org, February 26, 2011. http://www.un.org/News/Press/docs/2011/ sc10187.doc.htm (accessed January 17, 2012).

U.S. Congress. New Technology for NATO: Implementing Follow-On Force Attack. Office of Technology Assessment. Washington, DC: U.S. Government Printing Office, June 1987.

Warrick, Joby. "Clinton's efforts in Libyan war called vital." The Washington Post, October 31, 2011.

Wentz, Larry, ed. Lessons from Kosovo: The KFOR Experience. Washington DC: DoD Command and Control Research Program, 2002.

Wingfield-Hayes, Rupert. "Libya unrest: Defiant Gaddafi vows 'death or victory'." BBC.co.uk, August 24, 2011. http://www.bbc.co.uk/news/world-africa-14641572 (accessed on January 19, 2012).

Woodward, Margaret H. "Defending America's Vital National Interests in Africa." Speech, Air Force Association's 2011 Air & Space Conference & Technology Exposition, National Harbor, MY, 21 September 2011. http://www.af.mil/information/speeches/speech.asp?id=671 (accessed January 5, 2012).